



# NASA Procedural Requirements

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**NPR 7500.1**

Effective Date: December 20, 2001

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2006

**COMPLIANCE IS MANDATORY**

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## NASA Technology Commercialization Process w/ Change 1 (4/9/04)

**Responsible Office: Exploration Systems Mission Directorate**

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## Change History

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### NPR 7500.1A NASA Technology Commercialization Process

Chg#	Code/Center	Approved	Description/Comments
1	T	04/08/04	Administrative update to clarify the reporting protocol for unsafe conditions. Deletions of paragraph, references, etc, per Jennings memo dated 12/5/03 and administrative changes made throughout to change NPG to NPR.

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# Preface

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## P.1 PURPOSE

This document provides guidance for implementing the processes, requirements, and responsibilities of [NPD 7500.2](#), NASA Technology Commercialization Policy. As such, it directly supports the technology transfer and commercialization mission in the NASA Strategic Plan ([NPD 1000.1](#)).

## P.2 APPLICABILITY AND SCOPE

P.2.1 This NASA Procedural Requirements document applies to all NASA programs and projects established to Provide Aerospace Products and Capabilities (PAPAC) and Generate Knowledge (GK) as defined in [NPR 7120.5](#), whose existing or planned technological assets (technologies, innovations, facilities, and expertise) may have commercial application and/or benefit. Each NASA Strategic Enterprise is responsible for technology transfer and commercialization as it relates to that Enterprise's programs and projects, as required by [NPD 7500.2](#), Section 5b. Technology transfer and commercialization responsibilities of each NASA Strategic Enterprise and each Center apply whether its programs and projects are performed by NASA personnel or by NASA contractors or funding recipients. As such, this NPR applies to NASA Headquarters and NASA Centers, including Component Facilities, and to the Jet Propulsion Laboratory to the extent specified in their contract.

P.2.2 This NPR is consistent with the technology transfer and commercialization elements in [NPR 7120.5](#) and applies to all NASA programs and projects as defined in [NPR 7120.5](#).

P.2.3 The NASA Technology Commercialization Policy, [NPD 7500.2](#), and the present document rank first and second respectively in order of precedence for managing NASA's technology commercialization processes except if in conflict with statutory or regulatory requirements.

## P.3 AUTHORITY

- a. 42 U.S.C. 2457 and 2473(c)(1), Sections 305 and 203(c)(1) of the National Aeronautics and Space Act of 1958, as amended.
- b. 15 U.S.C. 3710 et seq., Stevenson-Wydler Technology Innovation Act of 1980 (P.L. 96-480), as amended.
- c. 35 U.S.C. 200 et seq., Bayh-Dole Act of 1980 (P.L. 96-517), as amended.
- d. 14 CFR Subpart 1245.1, Patent Waiver Regulations.
- e. 14 CFR Part 1260, Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations.
- f. 14 CFR Part 1274, Cooperative Agreements With Commercial Firms.
- g. 37 CFR Part 401, Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under government Grants, Contracts, and Cooperative Agreements.
- h. Federal Acquisition Regulations (FAR), 48 CFR Parts 27.3, Patent Rights under Government Contracts, and 27.4, Rights in Data and Copyrights.
- i. NASA Supplement to the FAR (NFS), 48 CFR Parts 1827.3, Patent Rights under Government Contracts, and 1827.4, Rights in Data and Copyrights.

## P.4 REFERENCES

- a. [NPD 1000.1, NASA Strategic Plan.](#)
- b. [NPR 1000.2, NASA Strategic Management Handbook.](#)
- c. [NPD 1050.1F, Authority to Enter into Space Act Agreements.](#)
- d. [NPR 1050.1, Space Act Agreements Manual.](#)
- e. [NPD 1080.1, NASA Generate Knowledge \(GK\) Process for Programs and Projects.](#)
- f. [NPR 1441.1, NASA Records Retention Schedules](#)
- g. [NPD 2091.1, Inventions Made by Government Employees.](#)
- h. [NPD 2092.1, Royalties and Other Payments Received by NASA from the Licensing of Patents and Patent Applications.](#)
- i. [NPD 2110.1, Foreign Access to NASA Technology Transfer Materials.](#)
- j. [NPD 2210.1, External Release of NASA Software.](#)
- k. [NPR 2210.1, External Release of NASA Software.](#)
- l. [NPD 2190.X, NASA Export Controls](#)
- m. [NPD 2220.5, Management of NASA Scientific and Technical Information \(STI\).](#)
- n. [NPD 2810.1, Security of Information Technology.](#)
- o. [NPG 2810.1, Security of Information Technology.](#)
- p. [NPD 7120.4, Program/Project Management.](#)
- q. [NPR 7120.5, Program and Project Management Processes and Requirements.](#)
- r. [NPD 7500.2, NASA Technology Commercialization Policy.](#)
- s. NPR 8705.X, Risk Management Procedures and Guidelines
- t. [NPD 9800.1, NASA Office of Inspector General Programs.](#)

## P.5 CANCELLATION

None.

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**/s/ Samuel L. Venneri**  
**Associate Administrator for Aerospace Technology**

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# CHAPTER 1. Technology Commercialization Policy Overview

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## 1.1 National Policy

1.1.1 In today's increasingly competitive global economic climate, the United States must ensure that its technological resources are fully utilized throughout the economy. Executive Order 12591 states: "The head of each Executive Department and Agency, to the extent permitted by law, shall encourage and facilitate collaboration among Federal laboratories, State and local governments, universities, and the private sector, particularly small business, in order to assist in the transfer of technology to the marketplace."

1.1.2 To ensure that NASA's existing and future technological assets contribute to U.S. economic growth, it is critical that they are quickly and effectively translated into improved production processes and marketable, innovative products. Accomplishing these objectives requires the Agency to develop new ways of doing business and new ways of measuring its progress.

## 1.2 NASA Policy

1.2.1 It is NASA policy to actively pursue technology commercialization and impart, to the maximum extent possible, the benefits of its technological assets to improve the national economy. NASA's Strategic Plan (NPD 1000.1) and Technology Commercialization Policy ([NPD 7500.2](#)) recognize the importance of the commercial technology mission and view commercialization as being as important as any mission in the Agency. The NASA Program and Project Management Processes and Requirements Document (NPR 7120.5), states that programs and projects will strive to enable the use of NASA technology by a U.S. firms for commercial application. [NPD 7500.2](#), paragraph 1.a expands this requirement to include other NASA activities whose planned or existing technological assets (innovations, technologies, facilities and expertise) have commercial potential. In this document, we will refer to all NASA programs, projects, and technological assets simply as NASA "activities."

1.2.2 NASA's Technology Commercialization Policy ([NPD 7500.2](#)) establishes the cornerstones for NASA's technology commercialization as follows:

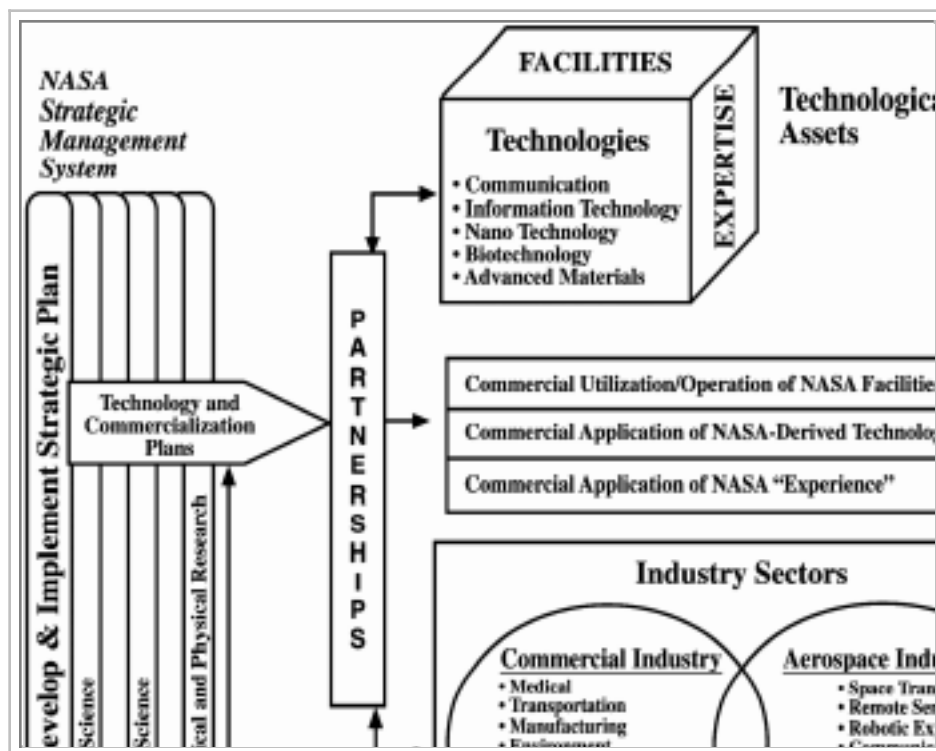
- a. Devoting 10 to 20 percent of its annual fiscal year research and development activity to commercial technology partnerships with the private sector;
- b. Requiring NASA activities whose planned or existing technological assets (technologies, innovations, facilities and expertise) have technology commercialization potential to emphasize commercial technology partnerships with U.S. industry from their onset and throughout their life cycle and that technology commercialization plans be required in all NASA activities which have commercial potential;
- c. Developing NASA aerospace technologies in commercial technology partnerships, and applying NASA technological assets in nonaerospace and aerospace markets which can result in economic benefits to the U.S. economy or to the quality of life;
- d. Expanding the participation of small disadvantaged, and women-owned small businesses in its commercial technology programs; and
- e. Utilizing NASATechTracS as the Agencywide commercial technology information system.

## 1.3 Strategic Overview

1.3.1 Figure 1-1 provides a strategic overview of the NASA technology transfer and commercialization mission.

Specifically, it shows how commercial technology partnerships combine both innovative technological assets and partners to achieve economic and/or quality of life impacts. Each Enterprise's strategic plan shall clearly identify technology commercialization as a priority goal and objective. Early technology commercialization planning by the Enterprises to address industry needs, is essential to effective commercial technology partnerships.

Figure 1-1 Strategic Overview of NASA's Technology Commercialization Mission.



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1.3.2 Several important themes recur throughout this document that embody the principles for executing an effective technology commercialization process. In general, responsibilities for technology commercialization within NASA are stated in [NPD 7500.2](#), Section 5 and in [NPR 7120.5](#), Sections 2 and 3. They are as follows:

- NASA programs/projects shall conduct early planning for commercialization. At the onset of the formulation phase, NASA managers shall determine their activity's commercial potential and develop a Technology Commercialization Plan and strategy for achieving that potential in accordance with requirements stated in [NPR 7120.5](#), Sections 2 and 3 (see Chapter 3 of this document).
- End-to-end customer involvement speeds the successful commercialization of NASA technology. NASA program/project managers shall identify in their technology commercialization plans, partners who can work collaboratively to achieve successful technology commercialization (see [NPR 7120.5](#), Sections 2 and 3; Chapter 5 of this document).
- NASA program/project managers shall ensure that technology commercialization objectives are addressed, as appropriate, in procurement contracts, grants, cooperative agreements and Space Act Agreements for which there is commercial potential (see Appendix D for guidance).
- NASA program/project managers shall report success stories that have resulted from partnerships identified in Paragraph 1.3.2c (see Chapter 6 of this document).
- NASA program/project managers shall use technology commercialization metrics and performance indicators in evaluating their technology commercialization efforts. These metrics and indicators will be collected and incorporated in the Program Management Council review process for those activities under [NPR 7120.5](#) (see Chapter 7 of this document).
- NASA program/project managers shall ensure that the planned technology exchange and partnership agreements comply with all laws and regulations regarding export control and the transfer of sensitive proprietary technologies.

1.3.3 This document defines a process for NASA program/project managers (heretofore called activity managers) to use in formulating, approving, implementing, and evaluating their technology commercialization activities. It is intended to be flexible and adaptable to the many types of activities that NASA conducts. NASA managers are challenged to use their expertise and apply innovative techniques to ensure that the technological assets (technologies, innovations, facilities and expertise) from their activities have maximum commercial application.

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## CHAPTER 2. Commercial Technology Program Process

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### 2.1 Process Overview

2.1.1 NASA's technology commercialization process continues to expand its business practices/mechanisms enabling the Agency to more closely align its way of doing business with that of the private sector. Commercial Technology partnerships are the common denominator in these practices.

2.1.2 All NASA activities with existing or planned technological assets that may have commercial application are subject to the technology commercialization process. Technological assets include technologies, innovations, facilities and expertise. The process' end objective for each activity is the same - that of maximizing each activity's commercial impact.

2.1.3 NASA's technology commercialization process is not a stand-alone process. Rather, it is integral to, and is accomplished within, the Agency's overall strategic management process, particularly through the Agency's program/project management process ([NPR 7120.5](#)), as well as NASA's technology planning process as defined in the NASA Technology Plan (<http://technologyplan.nasa.gov/>).

2.1.4 Figure 2-1 provides a more detailed illustration of the overall technology commercialization process and how it relates to NASA's strategic management process. The top portion of Figure 2-1 represents NASA's overall strategic management process. The shaded lower portion of Figure 2-1 shows the core components of the commercial technology process. While the initiation of these components is sequential, their implementation is predominantly parallel. The citation in the core component boxes (at the lower right corner), refers to the section in this NPR where more information is provided about that component.

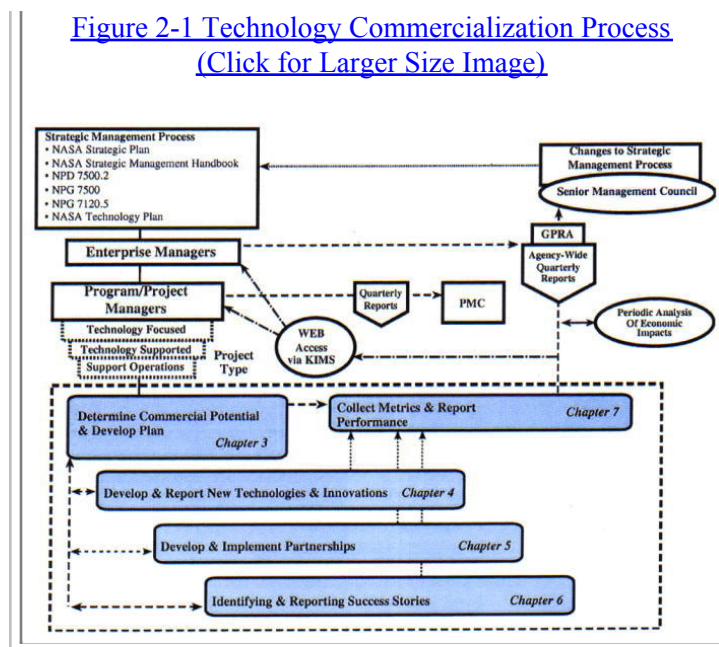
### 2.2 Program/Project Types

2.2.1 For purposes of NASA's Commercial Technology Process, there are three types of activities:

- a. Technology Focused Programs/Projects
- b. Technology Supported Programs/Projects
- c. Operations/Support Programs/Projects

The program/project types differ by their emphasis on, and implementation of, the technology commercialization process in the early stages of their programs/projects.

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**2.2.2 Technology Focused Programs/Projects.** Technology focused programs/projects are predominantly concerned with stretching the "state of the art" - i.e. technology advancement is their primary mission. These programs and projects are currently identified in NASA's Technology Plan (<http://technologyplan.nasa.gov/>). Technology commercialization and partnering for technology focused activities are discussed in Paragraph 3.4.

**2.2.3 Technology Supported Programs/Projects.** Technology supported programs and projects do not have technology development as their sole or primary mission but are usually focused on a scientific or exploration endeavor to which technology development may be necessary. Technology commercialization and partnering for technology supported activities are discussed in Paragraph 3.4.

**2.2.4 Operations/Support Program/Projects.** Operations support programs/projects do not generally have a technology focus. However, because of the often highly technical nature of operations/support activities, technological assets of value to the commercial marketplace often result. Technology commercialization and partnering for operations/support activities are discussed in Paragraph 3.5.

## 2.3 NASA TechTracS Information System (NTTS)

**2.3.1** [NPD 7500.2](#) establishes NASATechTracS (NTTS) as the Agencywide commercial technology information system. As such, NASATechTracS supports essentially all components in Figure 2-1. Specifically NASATechTracS supports the following technology commercialization functions:

- a. The identification and tracking of NASA activities with technology commercialization potential;
- b. The identification and tracking of planned and existing technological assets;
- c. The identification and tracking of NASA's commercial technology partnerships;
- d. Communication to the public of NASA and NASA-derived technologies and innovations;
- e. Success story repository, validation, and reporting;
- f. The reporting of Agencywide technology commercialization metrics; and
- g. Technology commercialization "electronic commerce" processes.

**2.3.2** NTTS consists of the following components:

- a. Standard core NTTS database systems located at each Field Center under the management of that Center's Commercial Technology Office

- b. Each Center's NTTS updates the Agencywide NTTS database in near "real-time;
- c. eNTRe, the electronic new technology reporting system - desktop and Web-based tools which allows researchers, scientists and engineers to capture and report innovations and new technologies; and
- d. KIMS, the Knowledge Integration and Management System (<http://kims.larc.nasa.gov>). KIMS is a web based module that assists NASA activity managers in managing and maintaining the status of their commercial technology activities.

The KIMS Web site provides additional guidance on the NTTS components and how they support the technology commercialization process.

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## CHAPTER 3. Formulating a Technology Commercialization Strategy and Plan

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### 3.1 Planning Overview

3.1.1 This chapter provides guidance to a NASA activity manager for developing an overall technology commercialization strategy and plan. For those NASA activities for which [NPR 7120.5](#) applies, a "Technology Commercialization Plan" should be prepared as part of the overall program/project plan during its formulation phase. Sections 2.1.4 and 3.1.4 of [NPR 7120.5](#) provide additional guidance on preparing this plan. Basically, the plan describes how the activity will implement the technology commercialization process. The plan's "robustness" will be determined by the activity's commercial potential (i.e., the activity's expected technological assets, their projected commercial applications, and their potential for partnering). Section 3.3 of this document provides additional guidance on the preparation of a Technology Commercialization Plan.

3.1.2 As specific technological assets are targeted for commercialization, a more detailed Technology Commercialization Plan may be justified. A sample Technology Commercialization Plan format is provided in Appendix A and may be used as a guideline in formulating the plan. The Technology Commercialization Plan shall be written at the outset of a program or project and evolve over time as commercial technology applications and partnership opportunities become more evident. Communication with the Center's Commercial Technology Office (CTO) for developing technology commercialization strategies and plans, is necessary. Each CTO can provide further guidance and specific examples of Technology Commercialization Plans.

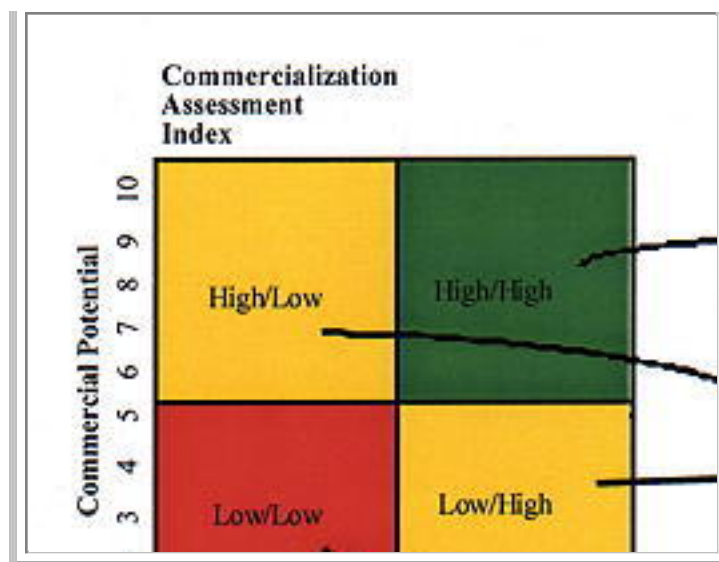
### 3.2 Determining Commercial Potential

3.2.1 Technology commercialization planning begins with determining the overall commercial potential of a NASA activity's existing or planned technological asset. This, in turn, determines how "robust" the plan and partnering strategy will be. Determining an activity's commercial potential involves three basic assessments performed by the activity manager with assistance from the CTO:

- a. The likelihood of the activity yielding innovative technological assets (technologies, innovations, facilities and expertise). Producing innovative technological assets is the minimum criteria for demonstrating commercial potential.
- b. The "market readiness" for the technological asset(s). Clearly, the commercialization of a technological asset will be difficult, if not impossible, if the market applications are not clearly evident or are immature.
- c. Whether the technological asset's technical maturity can be sufficiently advanced such that the level of risk is acceptable to a commercial technology partnership. This maturity level is likely to be related to, but not the same as, the technology readiness level (TRL) that NASA uses to determine if a technology is ready for insertion into a mission. Rather, this is a "commercialization readiness level" (CRL) that determines if the technology is ready for the market. It is recognized that determining the activity's commercial potential is subjective. The overall likelihood of a successful commercialization (i.e. commercial potential) is determined on a scale of 1 (low) to 10 (high). The likely timeframe (commercial readiness) for this happening is also estimated on a scale of 1 (relatively long-term, i.e., 5+ years) to 10 (short term, i.e., 1 year or less). As Figure 3-1 illustrates, an overall rating can be developed by combining these factors.

Figure 3-1 Commercialization Readiness Level Assessment Index

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Each activity should work closely with its Center's CTO in making a commercialization readiness level determination.

3.2.2 The NASATechTracS Information System is used to track the commercial potential of all NASA activities. Each activity's commercial potential is tracked at the 7-digit, UPN (Unique Project Number) level. A monthly summary is available to all NASA managers (CTOs can place NASA managers on a distribution list). A quarterly summary is provided to the Program Management Council. Chapter 7 provides more information on these summaries. Each Center is responsible for establishing its own internal policy for ensuring that the "commercial potential" status in NASATechTracS is kept current. Each Center's CTO can provide more information and access to this Web-based tool.

### 3.3 What to include in the Technology Commercialization Plan

3.3.1 Technology commercialization planning should begin as soon as the NASA activity's commercial potential has been determined. For those activities that are governed by [NPR 7120.5](#), the Technology Commercialization Plan shall be developed by the NASA activity manager as part of the overall program/project plan during the formulation phase and submitted for approval to the Governing Program Management Council (GPMC). The guidelines in NPR 1441.1, NASA Records Retention Schedules, should be followed to maintain and safeguard these records.

3.3.2 In general, Technology Commercialization Plans should address how the NASA activity is going to accomplish the following:

- Promptly identifying and reporting new technologies and innovations as they are realized (see Chapter 4);
- Developing and implementing commercial technology partnerships (see Chapter 5);
- Systematically evaluating and reporting on the success of those commercial partnerships (see Chapter 6);
- Incorporating standard technology commercial performance metrics and indicators into the activity's overall performance management and reporting (see Chapter 7); and
- Ensuring that all appropriate data is captured in NASATechTracS.

### 3.4 Commercialization Plans for Technology Focused and Technology Supported Program/Projects

3.4.1. It is generally expected that technology focused and technology supported activities will result in new technological innovations with a strong potential for commercial application, and thus result in more technology commercialization partnerships.

3.4.2. In addition to those factors listed in Paragraph 3.3.2, the Commercialization Plan for technology focused and technology supported programs should provide:

- a. An outline of the technology commercialization plan for the activity;
- b. A description of the expected technological asset(s) which may result from the activity which could have commercial applicability;
- c. Proposed partnership arrangements for commercializing one or more of the activity's assets identified above;
- d. A description of how technology commercialization will be incorporated into that activity's technology trade studies. (Incorporating technology commercialization factors into trade studies ensures that the technology's "Commercialization Readiness Level (CRL)" is being specifically considered along with NASA's traditional Technology Readiness Level (TRL)); and
- e. A report to the Center's CTO on any success stories that have resulted from its technological assets and partnerships.

The guidelines in NPR 1441.1, NASA Records Retention Schedules, should be followed to maintain and safeguard these records.

### 3.5 Commercialization Plans for Operations/Support Programs/Projects

These activities programs/projects do not generally include either "technology focused" or "technology supported" activities. Thus, it is not expected that the activity will implement commercial technology partnerships as early in the process as technology focused and technology supported activities. However, because of the often highly technical nature of operations/support activities, technological assets of value to the commercial marketplace often result. Thus, at a minimum, NASA managers of these activities should still develop a Technology Commercialization Plan which emphasizes the prompt reporting and processing of any technological assets developed by the activity. The guidelines in NPR1441.1, NASA Records Retention Schedules, should be followed to maintain and safeguard these records.

### 3.6 Communication of Commercial Technology Objectives to Contractors and Recipients

3.6.1 Over 80 percent of NASA's R&D resources are allocated, through its procurement process, to its contractors, grantees, and recipients. It is essential, therefore, that contractors, grantees, and recipients fully understand NASA's commitment to technology commercialization.

3.6.2 Based on the type of entity performing the work (i.e., small business, large business, college or university, or nonprofit organization), NASA contractors, grantees, and recipients who develop a technological asset under a NASA activity have, at their option, the right to either elect to retain title to the NASA-funded technology (small business, college or university, or nonprofit organization) or to obtain title to the technology through the NASA waiver process (large business). However, contractors, grantees, and recipients that obtain title to NASA-funded technology through the election or waiver process are required by statute to file patent applications and pursue commercialization, either directly or through a licensee or assignee. Generally, it is in the financial interest of contractors, grantees, or recipients that receive title to a NASA-funded technology to maximize the commercial utilization of the technology either on their own or through a licensee or assignee. NASA activity managers contemplating commercialization of a technology should consult their Center's Patent Counsel to determine the respective rights of the government and its contractors, grantees, and recipients in NASA-funded technologies (See Appendix B for more details regarding the respective rights of the government and its contractors, grantees and recipients).

3.6.3. Contractors, grantees, and recipients should be encouraged to support, and participate in, NASA's Technology Commercialization Program by assisting in the commercialization of technology developed under NASA procurement contracts, grants, cooperative agreements and Space Act Agreements. In accordance with applicable laws, and with the intellectual property clauses in contracts, grants, and cooperative agreements, contractors, grantees, and recipients are required to report innovations and new technologies developed under government funding. Additionally, intellectual property clauses in contracts, grants, and cooperative agreements with large businesses require the large businesses to establish and maintain active and effective procedures to ensure that new technologies and innovations are promptly identified and disclosed to the government. Although applicable laws provide contractors, grantees, and recipients the option to participate in the commercialization process through the election and waiver processes, they are not required to do so.

However, NASA activity managers should:

- a. Encourage contractors, grantees, and recipients to develop internal programs which address:

- (1) Educating and training their workforce in technology commercialization activities;
- (2) Motivating their employees to report innovations and new technologies in accordance with the New Technology or Patent Rights clauses in their procurement contract, grant, or cooperative agreement; and
- (3) Assisting subcontractor(s) with technology commercialization activities.

b. Consider applying the following thrusts in formulating contracts, grants, and cooperative agreements:

- (1) Providing performance award fees related specifically to technology commercialization performance; and
- (2) Including Technology Commercialization Plans and Technology Commercialization Reports as data deliverables (with a flow down to subcontractors).

3.6.4. Contractor, grantee, and recipient participation in NASA's Technology Commercialization Program may involve a number of different activities, including:

- a. Dual-use development of innovative technologies having applications both within and outside the aerospace community;
- b. Collaborative efforts and partnerships with third parties for the purpose of commercializing technology;
- c. Support to government-sponsored technology outreach and industry assistance programs that further the commercialization of technology; or
- d. Application engineering work for the purpose of adapting the developed technology to commercial application(s)

For those activities expected to have commercial potential, a Technology Commercialization Plan should strongly be considered as a Data Requirement Deliverable (DRD) in the solicitation. For guidance purposes, Appendix D provides an example of such a DRD.

3.6.5 Commercialization efforts and partnerships contemplated by NASA and its contractors, grantees, or recipients shall be reviewed by the Center's Commercial Technology Office prior to a formal agreement. Commercialization projects formed under a NASA procurement contract, grant, or cooperative agreement shall be approved in writing by the Contracting or Grants Officer. Such contracts or agreements shall state funding requirements, project description, scope of project, reporting requirements, and responsible NASA and contractor personnel. Ownership of rights to the technology developed under these collaborative and partnership activities shall be addressed in the individual agreements and shall be in accordance with federal statutes. Projects requiring government funds shall be approved in writing by the Contracting Officer.

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## CHAPTER 4. Identifying and Reporting New Technologies and Innovations (Including Software)

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### 4.1 What Are New Technologies and Innovations?

4.1.1 Procedurally, new technologies and innovations fall into one of two categories: "reportable items" or "subject inventions." The definitions of these terms, their reporting requirements, and their respective rights in reported technologies and innovations are essentially identical for contracts, grants and cooperative agreements. For contracts, the definition of a "subject invention" is provided in the Federal Acquisition Regulations (FAR) Sec. 27.301, Definitions, as modified by the NASA FAR Supplement (NFS) Sec. 1827.301, Definitions, while the definition of a "reportable item" is provided in NFS Sec. 1827.301, Definitions, (<http://www.hq.nasa.gov/office/procurement/regs/1827.htm>). The NASA regulations applicable to grants and cooperative agreements with institutions of higher education, hospitals, and non-profit organizations are provided at 14 CFR Part 1260 (<http://ec.msfc.nasa.gov/hq/grcover.htm>). The clause at 14 CFR Part 1260.28, Patent Rights, indicates that such grants and cooperative agreements are subject to the provisions of 37 CFR 401.14 (the standard Patent Rights clause developed by the Department of Commerce under the Bayh-Dole Act) which contains the definition of "subject invention." The NASA regulations applicable to cooperative agreements with commercial firms are provided in 14 CFR 1274 (<http://ec.msfc.nasa.gov/hq/grcover.htm>). Definitions may be found in the Patent Rights clauses at 14 CFR 1274.912 for large businesses and 1274.913 for small businesses.

4.1.2 Regardless of which clause is applicable, what qualifies as new technologies and innovations is very broad. They include any invention, discovery, improvement, or innovation that was either conceived or first actually reduced to practice in the performance of NASA work. This includes any new and useful processes, machines, manufacture, or composition of matter; or any new and useful improvement in existing processes, machines, manufacture, or compositions of matter. Also included are new computer programs, and improvements to, or new applications of, existing computer programs, whether or not copyrightable. A representative list of new technologies and innovations includes, but is not limited to: new or improved techniques, products, devices, materials, methods, processes, chemical compositions, systems, machines, apparatuses, articles, fixtures, tools, or software.

4.1.3 With such a broad definition, new technologies and innovations can come from almost any type of NASA activity. In addition, new technologies and innovations may occur at a system, subsystem, or component level. That is, the development of a "system" or overall "technology area" could yield numerous innovations.

### 4.2 Why Report New Technologies and Innovations (Including Software?)

4.2.1 New Technologies and Innovations (including software) should be reported because:

- a. Reporting is required of NASA employees by [NPD 2091.1](#) and of contractors, grantees and recipients by the terms of their contract, grant or cooperative agreement;
- b. Reporting New Technologies and Inventions as soon as possible after conception allows the Center's Patent Counsel to determine ownership and whether intellectual property protection is appropriate;
- c. Reporting prior to public disclosure, publication, or presentation at a conference allows the Center's Patent Counsel to file a patent application prior to possible statutory bars which may preclude patent protection;
- d. Filing a patent application establishes and protects the government's rights in the innovation.
- e. Secrecy provides little protection for the innovation;
- f. Publication, while allowing recognition through peer review, may jeopardize the possibility of obtaining a patent on the innovation;

- g. Identification of a new innovation can result in benefits to the U.S. economy and to NASA;
- h. Identification of a new innovation provides professional recognition;
- i. Reporting provides consideration for monetary incentive awards for the innovators (contact Center's CTO for more information); and
- j. Increased visibility and utility for the innovation can come from publication in NASA Tech Briefs once a patent application is filed or a decision is made not to file.

## 4.3 Who are the Innovators?

4.3.1 In many successful developments, there is a tendency to identify as many participants as possible to share in any rewards. However, in reporting new technologies and innovations, identify only those who have made direct, unique, and significant contributions to the conception of the innovation. Conception within the meaning of the patent law requires the formation, in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is thereafter to be applied in practice. The idea must be of specific means, not just a desirable end result, and must be sufficiently complete so as to enable anyone of ordinary skill in the art to which the invention applies, to reduce the concept to practice. To be a joint inventor, one must in some way have beneficially affected the final conception of the claimed invention.

4.3.2 When filing a patent application, properly identifying the inventors becomes very important. A patent can be declared invalid if either too many contributors (i.e., extraneous; noninventors included) or too few contributors (inventors omitted) are named on the patent application or patent.

## 4.4 Who Should Report New Technologies and Innovations (Including Software?)

4.4.1 New technologies and innovations (including software) should be reported by:

- a. Small business commercial firms awarded NASA procurement contracts or cooperative agreements to the extent required in the Patent Rights Clause in the contract or cooperative agreement.
- b. Large business commercial firms awarded NASA procurement contracts or cooperative agreements to the extent required in the New Technology Clause of the contract or cooperative agreement.
- c. Nonprofit organizations, colleges, and universities awarded NASA procurement contracts, grants, or cooperative agreements to the extent required in the Patent Rights Clause in the contract, grant, or cooperative agreement.
- d. In accordance with [NPD 2091.1](#), each NASA civil service employee who makes an invention is required to promptly report the invention.

## 4.5 How to Report A New Technology or Innovation

4.5.1 Figure 4-1 shows the process flow overview for identifying and reporting new technologies and innovations. The key parties are identified above each box in Figure 4-1. Appendix B provides a detailed explanation of the New Technology Reporting process and of the responsibilities of NASA personnel in that process.

4.5.2 All new technologies and innovations are tracked in NASATechTracS ([per NPD 7500.2](#)). In order to facilitate and minimize the burden of reporting, NASA has developed an electronic New Technology Reporting (eNTRe) capability. eNTRe (<http://entre.nasa.gov>) provides desktop and Web-based tools which allow the innovator to prepare and work on the New Technology Report locally and, when ready, to electronically submit the item to NASATechTracS. Each Center's Commercial Technology Office can provide assistance to NASA managers in obtaining access to, and using, eNTRe.

4.5.3 New technologies and innovations can also be reported with a form. NASA Form (NF)1679, Disclosure of Invention and New Technology (Including Software), is the preferred form. However, contractors may use their own company invention disclosure forms as long as the company form provides information equivalent to that requested in NF 1679. In accordance with specific Center practices, NASA civil servant employees should submit NF 1679 to their Center's Commercial Technology Office or Patent Counsel. The receiving Office will then disseminate the NF 1679 to

appropriate Center Offices involved in the Technology Commercialization Program. NASA contractors, grantees, and recipients will submit NF 1679 or other appropriate reporting forms to the NASA New Technology Representative named in the contract, grant, or cooperative agreement.

4.5.4 As NASA contractors report new technology developments, NASA activities are encouraged to investigate commercial applications of those technologies and to establish partnerships for applying the new technologies to commercial industry products and services.

## 4.6 How is a New Technology's Commercial Potential Assessed?

4.6.1 Commercial potential is tied to the value of the technology - its potential benefits, its advantages in the marketplace, and its impact on profitability. Several essential technical, market, and intellectual property issues must be addressed when assessing value. Secondary sources of information (e.g., published data, market research reports, Internet searches) and primary sources are probed. Primary sources include inventors, experts, end-users, and potential licensees. Experts can be found in industry, academia, and government laboratories. The Center's Commercial Technology Office and Patent Counsel have the lead in performing this assessment.

4.6.2 The assessment should focus on determining commercial viability by, among other things, considering the following questions:

- (1) Does the technology add value throughout the supply chain?
- (2) Does it make a product that is better than the existing and emerging technologies?
- (3) Is someone willing and able to develop and build, and someone willing to buy the end product - and will both realize increased value?
- (4) Can the technology be commercialized while a market opportunity exists?

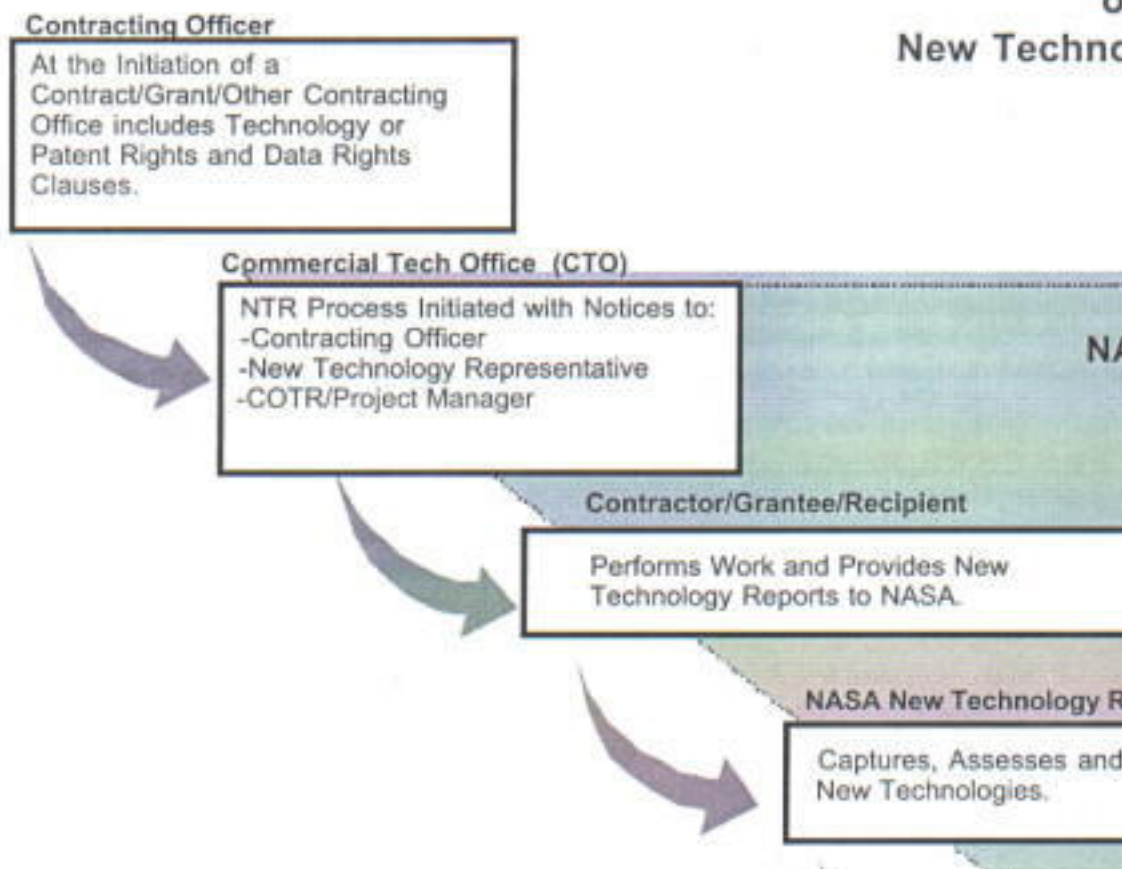
4.6.3 One exemplary method of assessing commercial potential is to consider the following two factors: the technology's commercialization readiness (internally determined); and the technology's market readiness (externally determined).

a. Commercialization readiness - If a technology has been successfully demonstrated in an advanced prototype, it is much more likely to gain the attention of the market. If the innovation is merely a concept, even a good one, the prospective technology adopters may not give it much credence. This assessment is usually performed by the activity manager and entered into KIMS.

b. Market readiness - Evaluation for market readiness is primarily based on externally gathered data through the Center's CTO. Favorable market acceptance is judged by the following factors:

- (1) Can the technology be developed into a product that meets a substantiated need;
- (2) Have companies been identified that can and will take the technology from its current stage of development to a commercial product (or cause this to happen);
- (3) Can the adopting companies commercialize the technology at a cost and price that will provide an acceptable return on investment; and
- (4) Have sufficient end users been identified that not only need the innovation but are willing to pay an acceptable price to provide a reasonable profit margin.

**Figure**  
**Functional**  
**Flow**  
**of**  
**New Techno**



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## CHAPTER 5. Developing and Implementing Commercial Technology Partnerships

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### 5.1 What Are Commercial Technology Partnerships?

5.1.1 Commercial technology partnerships are collaborations among the government, industry, and/or academia wherein each party commits resources to the accomplishment of agreed-to objectives and shares the risks and rewards of the endeavor. In general, to qualify as a commercial technology partnership, the arrangement should include the following criteria:

- a. The partnership must be documented in a form which, at a minimum, substantiates the relationship between the partner and NASA;
- b. The partnership must include at least one of the following parties: NASA, JPL, or a contractor, grantee or recipient acting under an appropriate legal instrument, such as a contract, grant, cooperative agreement, or Space Act Agreement;
- c. The partnership should have an intent of either commercializing a NASA-derived technological asset or providing support for a private sector or university-derived technological asset; and,
- d. The partnership must anticipate the transfer of technical know-how or data from one entity to another.

**Note:** NASA technology commercialization activities are intended to foster domestic utilization of NASA-developed technologies among the public and private sectors of the U.S. economy. Consequently, NASA does not form partnerships with foreign entities, except as provided in [NPD 2110.1](#) and [NPD 2210.1](#).

5.1.2 In addition, commercial technology partnerships can usually be characterized into one of the following categories:

- a. Contractor Technology Commercialization: Commercialization of technologies developed under NASA contracts, grants, cooperative agreements, and Space Act Agreements.
- b. Industry-led Partnerships: The formation, funding, and implementation of industry-initiated and-led partnerships with NASA to develop aeronautics and space technologies, including dual-purpose technologies.
- c. Commercial Product Development: Industry-led development of commercial products and services from space.
- d. Dual-Purpose Technology Development: NASA technology development with dual-purpose applications in the aeronautics/space industry as well as in the nonaerospace commercial industry.
- e. Small Business Development: The formation, growth, and accelerated development of small business by bringing together the five essential contributing business success factors: technology, talent, capital, business know-how, and market need.
- f. Regional Alliances: Alliances with state and local governments and other federal agencies.

### 5.2 NASA Commercial Partnership Goal

In accordance with [NPD 7500.2](#), NASA's annual investment in commercial technology partnerships should equal 10-20 percent of its investment in its R&D base. This goal is not a tax or a set-aside. It does not aim at doing 10-20 percent more work by adding industry R&D objectives. Instead, it strives to achieve at least 10-20 percent of NASA's mission and technology objectives through commercial partnerships. Chapter 7 and Appendix C provide more detail on how this metric is computed.

## 5.3 Implementing Mechanisms for Commercial Technology Partnerships

5.3.1 Given the criteria in Section 5.1.1, technology commercialization partnerships can be implemented via a broad set of mechanisms as follows:

- a. Cooperative Agreements: All cooperative agreements are counted as partnerships, provided that they meet the criteria in Section 5.1. Currently NASA counts the entire investment in these activities toward the partnership goal.
- b. Space Act Agreements: This includes nonreimbursable, reimbursable, and funded Space Act Agreements, including Joint Sponsored Research Agreements (JSRAs), provided that they meet the Section 5.1 criteria. Software Usage Agreements and Technology Transfer Agreements are also included within this category. NASA currently counts the entire investment (or dollar equivalent, e.g., when NASA Facilities such as wind tunnels, Space Shuttle, Space Station, etc., are provided to the private sector for R&D) toward the partnership goal.
- c. SBIR/STTR Program: Because of the strong commercialization language in these programs, NASA currently counts the entire investment toward the NPR goal.
- d. Cost-Sharing Contracts: A cost reimbursement contract in which the contractor receives no fee and is reimbursed only for an agreed-upon portion of its allowable costs.
- e. Independent Research and Development (IR&D) contracts: Contracts with private sector firms conducting Independent Research and Development activities (IR&D) are counted as partnerships. The allowable amount of the IR&D costs under FAR 31.205-18 is counted in this partnership category as NASA's investment.
- f. Licenses: NASA may license a new technology/innovation only if it owns, either directly or through assignment, a patent application, a patent or a copyright covering the innovation. Licensing of new technologies and innovations is the key partnership mechanism with respect to NASA "in-house" development activities. NASA may also license new technologies and innovations developed under NASA contracts, grants, and cooperative agreements. NASA will count an estimate of its investment in the licensed technology towards the partnership goal. Licensing the same technology for multiple applications does qualify as multiple partnerships. However, counting the Agency's technology investment multiple times has raised concerns about the credibility of these criteria in this specific situation. While an economic case can be made for counting the Agency's investment multiple times, valuing these type partnerships must be examined on a case-by-case basis.
- g. Data, Information, and Research Provided for Potential Commercial Use: NASA makes remotely sensed data, information, and related research available for use by federal, state, and local government agencies and the private sector including universities and industry. Many agreements are made with these non-NASA organizations to demonstrate and validate the utility of NASA-produced remotely sensed data and associated scientific research when applied in local and regional scenarios and commercial ventures. Many are done through a commercial "value-added" information user. These data and information are provided at no cost to partners in the demonstrations and at "the cost of reproduction" to other users. NASA remains responsible for ensuring data validity through its retention in NASA-owned or-sponsored archives. Significant NASA effort and resources are committed to generating and maintaining these data sets, scientific models, and research results for use by the broad community. NASA will count its investment in providing access to the information and research as its contribution to a continuing and growing partnership with the commercial community at large. NASA's investments needed to develop, operate, and maintain the remote sensing instruments, systems, and models could legitimately be included as well.

5.3.2 Cooperative agreements, Space Act Agreements, SBIR/STTR, and cost-sharing contracts tend to be very "efficient" mechanisms in that NASA will count its entire investment in these activities toward the partnership goal. However, in order to count any of these mechanisms as a commercialization partnership, the activity must have significant commercial potential.

5.3.3 All commercial technology partnerships are tracked in NASATechTracS. Each Enterprise and Center is responsible for identifying its activities that qualify as commercial technology partnerships and providing valid and current data on those activities including the investment estimates associated with several of the mechanisms discussed above, where appropriate. As discussed earlier, each CTO is available to support the program and project managers in this task.

## 5.4 Identifying Potential Partners

5.4.1 Identifying potential technology commercialization partners is perhaps the most challenging part of the overall

technology commercialization process. The difficulty can vary with the type of partnering mechanism that is likely to be used. For example, while cost-sharing contracts may be a very efficient partnering mechanism from NASA's viewpoint; it may be difficult finding willing and qualified partners even if there is significant commercial potential associated with the activity. Often this type of activity may require third parties working with the primary partner in order to successfully realize the commercial potential.

5.4.2 Recognizing this difficulty, the NASA Commercial Technology Network (NCTN) provides a marketing/outreach infrastructure to support NASA managers in finding potential partners. Marketing/outreach activities available through NCTN include:

- a. Showcasing your partnering opportunities to potential industry partners at trade shows;
- b. Promoting your partnering opportunities through TECHFINDER via TOPS (Technology Opportunity Sheets) and Technology Profiles;
- c. Targeting companies by direct mail who are in an industry that can benefit from NASA technology;
- d. Showcasing NASA technology at business seminars with high-level corporate executives;
- e. Targeting companies in different industries through magazines and public service announcements;
- f. Publishing the opportunities in NASA's key publications to include: TechBriefs and Aerospace Technology Innovation (ATI) magazine;
- g. Utilizing press releases featuring new technologies;
- h. Utilizing the national gateway (a staffed 1-800 phone service/Web site for identifying technology interests) at the National Technology Transfer Center (NTTC); and
- i. Utilizing a regional gateway through the Regional Technology Transfer Center (RTTC) in your region.

5.4.3 Each Center's Commercial Technology Office (CTO) is staffed with technology commercialization specialists who can assess partnering opportunities and determine the optimum method for finding an industry partner. They are a resource to you and are your point of contact to perform any of the functions listed above.

5.4.4 Recognizing that premature dissemination of information disclosing a specific technology may create a statutory bar precluding NASA or its partners from obtaining patent protection, each Center's Patent Counsel must approve the technology as releasable to the public before information disclosing the technology may be publicly released. Thus, prior to any marketing/outreach activity concerning a particular technology, the technology must be reviewed by Patent Counsel and approved for public release. Additionally, whether or not NASA may release information on a specific technology to an external entity is dependent on NASA's rights in the technology and whether NASA has obtained intellectual property protection on the technology. Release of information on a technology, such as may be included in an activity's Technology Commercialization Plan, may require the execution of a Nondisclosure Agreement by the receiving party. Again, consult your Center's Patent Counsel.

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## CHAPTER 6. Identifying and Reporting Technology Commercialization Success Stories

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### 6.1 What Is A Technology Commercialization Success Story?

6.1.1 Technology commercialization success stories are defined as those commercial technology partnerships which have actually achieved an "acknowledged use or application" of the related NASA technological asset. At least one of the following impacts should have resulted from the acknowledged use:

- a. Commercial sales;
- b. Cost savings/avoidance;
- c. Private investment;
- d. Jobs created/saved;
- e. Quality of life improvement
- f. SBIR/STTR sales of product, services to the private sector; or
- g. SBIR/STTR Phase III procurement contracts within the federal government or
- h. New or improved products/processes.

6.1.2 A success story must be tied to a NASA-derived technology or a commercialization partnership.

### 6.2 Finding and Reporting Success Stories

6.2.1 Each NASA activity manager shall systematically track and follow-up on its commercial technology partnerships to determine if that partnership has produced any success stories. NASATechTracS has the capability to automate this process through various automated follow-up mechanisms (e.g., e-mail notifications, letters of inquiries, etc.). The Center's CTO can assist in determining the best approach for the system's use in obtaining success story information.

6.2.2 Once identified, key data on the success story should be reported by the NASA activity to the CTO. Success stories can be reported electronically via URL:  
[http://webawntts.larc.nasa.gov/success\\_stories/NASASuccessStory.html](http://webawntts.larc.nasa.gov/success_stories/NASASuccessStory.html). Definitions of the key data elements needed for a success story are defined on this Web site.

6.2.3 Success stories can be very beneficial to a NASA activity. They can be used as marketing tools to further the technology commercialization process by gaining more publicity for NASA efforts. NASATechTracS can assist with storage of success story information for future queries and reports and can be accessed via TECHFINDER at <http://technology.nasa.gov>. Selected success stories are published in NASA Spinoffs, and Innovations which can be accessed at <http://nctn.hq.nasa.gov>.

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# CHAPTER 7. Managing Technology Commercialization Performance

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## 7.1 Technology Commercialization is Performance Based

7.1.1 Consistent with NASA's Strategic Management Handbook ([NPR 1000.2](#)), technology commercialization has become a performance-based activity. Currently, most NASA activities specifically report and manage technical, cost, and schedule performance. Technology commercialization performance will now be included as a reportable item within each applicable NASA activity.

7.1.2 As directed in [NPD 7500.2](#), this NPR establishes a standard "core set" of metrics and trend indicators to be used across all NASA activities. Metrics differ from "trend indicators" in that metrics can be quantified, assigned specific goals, measured, and a variance computed and analyzed. Trend indicators are performance items which get base lined and trended over time. These indicators do not have specific goals and thus no variances. Rather, the trend is analyzed to determine if it is moving in the right direction and at an acceptable rate.

## 7.2 What is the Core Set of Performance Data?

7.2.1 Figure 7-1 shows the technology commercialization hierarchical categories from which the core set of performance data is derived. Figure 7-1 is basically a hierarchical representation of the overall technology commercialization process described in Chapter 3. Table 7-1 shows the specific metrics and trend indicators within each category. Appendix C provides a detailed definition of all the items in Table 7-1.

7.2.2 As Table 7-1 shows, there are only two metrics in the core set with the other items being trend indicators. NASA submits both of these metrics as part of its annual Accountability Report in response to GPRA. The "technologies released to the public" metric is collected and reported in support of NASA's Communicate Knowledge (CK) process - one of the cross-cutting processes in NASA's Strategic Plan. The "partnership investment" metric is collected and reported in support of NASA's Provide Aerospace Products and Capabilities (PAPAC) process - the other major NASA cross-cutting process. Again, additional detail on these two metrics is given in Appendix C.

7.2.3 Each NASA activity will be able to access its core set of metrics and trend indicators (as well as other status information) in NASATechTracS via a Web portal called KIMS (Knowledge Integration & Management System). The metric and indicator data in KIMS will be updated monthly. The Center's Commercial Technology Office (CTO) can assist program/project managers with gaining access to, and utilizing, KIMS.

## 7.3 Determining and Reporting the Performance Status

7.3.1 Working closely with their respective CTO, each NASA activity should review the core set of metric and trend indicator data and determine the status of its technology commercialization efforts. As discussed earlier, the NASA activity manager may include other data in the assessment, if applicable. However, such data should be viewed as supplemental to, and not in lieu of, the core set.

7.3.2 All NASA activities should incorporate technology commercialization performance into their normal performance reporting process. For those programs under [NPG 7120.5](#), this will be accomplished via the Quarterly Program Status Report (QPSR) provided to the Governing Program Management Council (GPMC).

7.3.3 Under the QPSR approach, technology commercialization performance is to be assigned a green, yellow, or red status. A green status implies that technology commercialization performance is satisfactory. A yellow status indicates that there are some issues, but corrective actions are underway and on-schedule. A red status indicates that there are significant issues and that corrective actions are behind schedule. Appendix C provides an example of a QPSR with

technology commercialization performance included. More information on the GPMC can be found at <http://www.hq.nasa.gov/office/codea/codeae/pmc.html>.

Figure 7-1 Hierarchy of Technology Commercialization Performance Categories



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Table 7-1 Listing of Metrics and Trend Indicators by Category

Category	Item	
Commercial Assessments	Activities with Commercial Potential	
	Activities with New Technologies	
	Activities without New Technologies	
New Technologies	Year-to-Date Technology Portfolio	
	Total Current Technology Portfolio	
	Technologies Released to Public	
	Portfolio Available to Public	
Partnerships	Active Partnership Portfolio	
	Partnership Investment	

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7.3.4 Per [NPD 7500.2](#), the Associate Administrator for the Aerospace Enterprise will provide a quarterly Agencywide summary of the core set of performance data to the Associate Deputy Administrator and to the Senior Management Council. This report will summarize the data by both Enterprise and Center.

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## CHAPTER 8. Training and Education

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### 8.1 Introduction

[NPD 7500.2](#), defines NASA's responsibility to "....provide commercial technology training to employees involved in commercialization processes (e.g., program/project engineers, commercialization specialists, procurement officials, etc.)" to enable them to fulfill their job requirements and to enable the Agency to achieve its (technology commercialization) goals.

### 8.2 NASA Sponsored Technology Commercialization Training Development

Recognizing that Agency employees will require a variety of courses and instructional approaches to meet technology commercialization requirements, the Agency offers the following training:

- a. A course on Technology Commercialization for NASA Program & Project Personnel. This course is offered under the sponsorship of the NASA Headquarters Academy for Program Project Leadership (APPL) supported by the NASA Office of Human Resources & Education.
- b. An executive-level technology commercialization video geared toward NASA management, program and project managers, COTRs, and scientists and engineers. This 6-minute segment features some of the most successful NASA commercialized technologies and their impact, both internal and external, to NASA.
- c. Web-based training materials will be available on Intellectual property, Patent Law, Technology Reporting, Technology Transfer and Commercialization for Program and Project Personnel, and other courses as they become available.
- d. Commercialization Training courses for NASA personnel (paragraph 8.3).
- e. Alternative information and training resources including:
  - (1) NASA Commercial Technology Network (NCTN) and National Technology Transfer Center (NTTC) Websites which provide a variety of information on NASA technology commercialization activities, and links to other relevant sites: The URLs for these sites are: NCTN: <http://www.nctn.hq.nasa.gov/>; NTTC: <http://www.nttc.edu/>; Commercial Use of Space: <http://commercial.nasa.gov/>; <http://www.nttc.edu/>; Commercial Use of Space: <http://commercial.nasa.gov/>.
  - (2) A Web-Based Technology Commercialization Resource Guide, containing technology commercialization information pertaining to NASA and other federal laboratories URL: <http://www.nttc.edu/products/guide/index.html>.
  - (3) Video Case Studies which illustrate successful NASA technology commercialization.
  - (4) Space Product Development program activities and accomplishments, <http://commercial.nasa.gov/>.

### 8.3 NASA Sponsored Technology Commercialization Training Courses

Technology commercialization training courses are available to NASA personnel through the following methods:

- a. Agencywide offerings on APPL schedule.
- b. Individual courses available on the NTTC Website: <http://www.nttc.edu/services/nasatraining.asp>.
- c. Center-specific training course offerings.

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# Appendix A. Sample Technology Commercialization Plan Format

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## What is a "Technology Commercialization Plan"?

A Technology Commercialization Plan addresses specific technological assets targeted for commercialization. It should be prepared by the NASA activity manager with the assistance of the CTO. Such a plan is a tool whose function is not only to serve internal NASA management needs, but also to supply information to external organizations that may be critical to success. Recognizing that premature dissemination of information disclosing a specific technology may create a statutory bar precluding NASA or its partners from obtaining patent protection, each Center's Patent Counsel must approve the technology as releasable to the public before information disclosing the technology may be publicly released. Thus, before a Technology Commercialization Plan disclosing information on a particular technology may be released to external organizations, the technology must be reviewed by Patent Counsel and approved for public release. Additionally, whether or not NASA may release information on a specific technology to an external entity is dependent on NASA's rights in the technology and whether NASA has obtained intellectual property protection on the technology. Release of a Technology Commercialization Plan may require the execution of a Nondisclosure Agreement by the receiving party. Again, consult your Center's Patent Counsel. The Technology Commercialization Plan should be used as a road map that establishes objectives, strategies and an approach to achieving those objectives. Utilizing such a road map not only facilitates internal communications, but encourages staying the planned course. Of major importance is that the Technology Commercialization Plan should be reviewed frequently, and to remain useful, needs to be updated accordingly. *Always remember that for help with any aspect of a Technology Commercialization Plan, contact your Center's Commercial Technology Office.*

## So, what needs to be in it?

There are several standard sections that should appear in every Commercialization Plan. The important thing to remember is to customize the Technology Commercialization Plan to fit your particular venture. The following sections are a good guideline to start your first plan:

### Executive Summary

This may very well be the most important section of your Commercialization Plan. Often times the Executive Summary is the ONLY portion of a Technology Commercialization Plan that is read by outside sources. The Executive Summary should be concise, but informative about potential innovation(s) while creating interest. Describe the potential product(s), their unique competitive advantage, and development and technical milestones.

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### Product Description

Clearly describe the commercial product(s) in terms that a "layperson" could understand, and include in the description:

- a. A technology description that is suitable for review by individuals with technical and business backgrounds;
- b. How the product(s) will benefit the customer (what is its uniqueness); and
- c. Projections of technology readiness (e.g., how long and how many resources will it take to produce a transferable product).

## Target Market and Competition

This section should demonstrate strong market knowledge and list those market area(s) to be targeted. Included in this section should be:

- a. A description of the target applications, including (if appropriate) a priority ranking that identifies the highest impact applications that deserve primary attention. Include possible fields of use for later licensing action;
- b. A market analysis and research reports that show the market need for the particular product(s) and lists key customers;
- c. An overview of the tactics to be used to connect to industry, which may include news releases, publications in government periodicals, direct mail, networking, technology briefings, and presentations at technical conferences, trade shows, or workshops;
- d. The timelines and action steps to develop early partnerships, collaborations, field testing, etc;
- e. A description of technical expertise, facilities, and other resources that NASA could obtain through collaborations with companies;
- f. The inclusion of comprehensive target company lists is not necessary for this plan, but the identification of the action step for identifying target companies is necessary;
- g. The intellectual property protection and business development tactics, including marketing plans, need to mesh with the technical development and precompetitive partnering activities; and
- h. Specific patent and licensing strategy.

## Management Description

Identify the key business and technical management personnel. Include technical experience and skills, and show how these individuals give a distinct competitive advantage to the venture.

## Operations

Describe the plan and schedule to develop and/or produce the end product, and include:

- a. An understanding of the technologies that will be applied to produce the planned product and an understanding of the new technology as it may impact the commercial market. This step consists of developing an understanding of the unique capabilities, limitations, characteristics, or other features of the technology. To do this, the planner must develop an understanding of the state of the art in the intended fields of use. Questions to be answered include the following:
  - (1) What are the competitive technologies? Emerging technologies? **Note:** Information on competitive technologies is derived from Web-based searches, previous market and technology reviews, and direct contact with industry experts.
  - (2) Is the new technology expected to be better than existing technology - in what ways? **Example:** A new joint may be a stronger design, allowing the assembly to handle much higher service loads.
  - (3) Will it be faster - by what measure? **Example:** A new joining procedure may take fewer steps, allowing the manufacturer to double the process throughput.
  - (4) Will it be cheaper - as a unit or in an assembly? **Example:** A new joint may not require an adhesive where the existing technology always requires this expense.
- b. Potential development obstacles. Questions to be answered include:
  - (1) What are the known potential barriers to market acceptance? **Example:** The primary user may be in a heavily regulated industry, e.g., involving public safety, where new ideas (even great ones) face many months or years of acceptance testing and certification.
  - (2) Will the new technology eliminate (or add) an environmental problem? **Example:** The new joining technique may eliminate a machining step that required expensive capture and disposal costs for hazardous waste scrap.

c. Relationship between the commercialization activity and the mission-related activity, including the commercial use of space. The goal of this step is to develop an understanding of the technology needs in the market that may be related to the mission technology program. If NASA's mission objectives can be met while making accommodations to enhance the value to industry, there are improved chances for a successful commercialization. A common approach to understanding the market is to begin by determining the value of the new technology to a company and its customers. Companies will consider investing in a new technology when it has the potential to increase sales or to decrease costs either for the company or its customers. Even if NASA's candidate technology shows that kind of promise, it still must compete with the company's other investment opportunities. Searching secondary sources of information, such as published reports, databases, and the Internet, only provides basic data. Interviews with industry experts (i.e., primary information sources) will be key to understanding the market issues that will affect the chances for commercialization of a new technology. Examples may provide some insight.

Example: NASA will develop a new material that is expected to increase the operating life of bearings by a factor of 10. With some research, it is discovered that an increased operating life is desirable to industry, but that doubling is all that is required if the cost is not increased. The expected cost of NASA's technology will lead to an unacceptable cost increase. If the new material can be developed for less endurance and lower cost and still meet the objective of the NASA program, it may be better to change the program direction. Many other issues need to be considered (e.g., licensing, manufacturing, distribution channels, emerging competing materials), but this example demonstrates the process of identifying an industry need and modifying the NASA direction to satisfy both needs early in the planning stage.

Example: NASA expects to develop a new approach to modeling scientific processes. Early prototypes show promise. Science domains consisting of expert experience, engineering principles, scientific constants, and others can be created and manipulated with high-level graphical user interfaces. Capabilities are expected to be unparalleled in industry. Expectations for commercialization appear to be very high. Early research, however, uncovers the fact that software companies that develop and sell similar scientific products have a backlog of projects needed by their customers. Their development planning cycle is projected for 2 years with new software and revisions that are known to be profitable. Their programming staff is overloaded, and the prospects for staff growth are dim. In this environment, companies will be reluctant to pursue external opportunities, even if they are attractive. In this example, careful research uncovered a significant barrier to commercialization that was not initially apparent. Possibilities may still exist for working with start-up companies, incubator companies, or other entrepreneurs.

d. Approaches for connecting with the market. Presuming that the new technology can be shown to be of sufficient value to industry, the next consideration is to analyze the possible paths to market. Many options can be explored and different models may make sense for different situations. Below are some examples:

(1) Develop a partnership with a company early in the program. Example: The software example mentioned above may benefit from a collaboration early on, where the company may be much more likely to develop a commercial version. Also, specific technical expertise from a company may be brought into a program to save NASA time and money in developing related technology.

(2) Develop a partnership with several companies or a consortium early in the program. Example: NASA plans to perform research on an enabling hazardous waste treatment method. Funding and staff exchanges may be possible based on a consortium model. The outcome could include a wider distribution of the results and quicker commercialization. In addition, NASA would be assured of commercial sources for treating its hazardous waste inventory.

(3) Solicit peer reviews of the program while there is time to influence the program to optimize its market value. Example: A new technique to synthesize a chemical has been demonstrated in the lab. Before moving to the next phase, it may be beneficial to probe the industry to determine which variations on the proposed method would bring the most value to industry.

(4) Wait until the core technology is proven on the bench, then form partnerships. **Example:** Many trials and failures often characterize materials development. It may make sense to wait until confidence is high before expending the resources to develop collaborations. Collaborations often are necessary in order to have larger batch samples made for end users and to have materials characterization tests performed. (Wait until moderately advanced prototypes are ready, then seek company support or licensees. Example: NASA clearly has the leading experts in the field, work has progressed well, and the new technology may be important to the Nation's position in the global market. NASA may want to carry the development work to the final stages and file for patent before publicizing the work. This approach gives U.S. companies a better chance of licensing and using the technology before the offshore competition can react).

(5) For technologies that are useful to industry, an active approach to commercialization should be selected, such as

publishing results, presenting papers, holding workshops, marketing the technology via the Web, or participating in trade shows.

e. Intellectual Property (IP) protection considerations early in the program. NASA may license Government-owned technology only if the Government owns a patent, patent application, or copyright on the technology. If patentable technologies, including copyrightable software, are expected to arise from the program, your Center's Patent Counsel should be consulted to determine whether the Government or the industry partner will obtain or retain the Intellectual Property, and language concerning this issue should be contained in the contract or agreement. Government inventions with market potential should be considered for patenting so that they may be licensed and license royalty income obtained to offset some or all of the government cost to commercialize the technology.

f. Characterize the level of support that the responsible technical organization will commit to the process after a license has been signed. Success is often assured or lost based on the transfer of know-how along with the intellectual property rights.

g. Identify sufficient control processes that will ensure that the innovators are allowed to meet their mission requirements while simultaneously making necessary contributions to the commercialization objective.

h. Identify a target range of milestones for expected commercialization success.

(1) Develop specific milestones when partnerships are anticipated to be in place.

(2) Develop specific language for technology commercialization requirements to be placed, in applicable cases, in task orders, or statements of work to be performed by contractors or recipients.

i. Document the Plan. The final step is to document the plan based on the findings of the analysis of the technology and the market. Before a plan can be documented, key conclusions and decisions need to be made. Based on the research and analysis outlined above:

(1) Identify which parts of the technology development program will likely produce commercially attractive technology.

(2) Adjust program plans appropriately to accommodate commercially important features.

(3) Create a commercialization roadmap.

(4) Decide whether the commercialization effort (and technology development effort) will benefit from early industry involvement.

(5) Determine the most effective level of industry involvement.

(6) Create the general plan for protecting important intellectual property.

(7) Anticipate the mechanisms for marketing the technology.

The plan should be a product of technical staff, technical management, commercial technology office staff, and Patent Counsel. Each of these contributors might draw on external sources for information and advice. In fact, an external source could very well facilitate the development of the plan.

## Risk Management

For commercialization activities associated with programs and projects which follow the processes and requirements of [NPR 7120.5](#) (NASA Program and Project Management Processes and Requirements), clearly describe the approach to be taken to risk management. This would include a description of the responsibilities of all parties to any partnerships or collaborations among the government, industry, and/or academia in sharing risks of the endeavor.

## Schedule

Provide the schedule for development, production and marketing of the end product(s).

## Appendices

Include any relevant attachments (e.g., patents, market research studies, agreements) and a definition of terms.



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## Appendix B. New Technology Reporting Process

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The government does not license "inventions," per se, but licenses patents and patent applications on inventions, including software, owned by the government. The government also licenses copyrights in software that have been assigned to, or are otherwise owned by, the government. In general, the government owns inventions made by its employees as a result of their employment. Each NASA employee who makes an invention is required to submit a disclosure of such invention to the Office of the General Counsel, or to the delegated Center Patent Counsel. Reporting of inventions by government employees is covered in [NPD 2091.1](#), Inventions Made by Government Employees.

The government may also own inventions made under Federal funding agreements. Funding agreements include contracts, grants, and cooperative agreements for the performance of experimental, developmental, or research work and also includes subcontracts thereunder. NASA's policy with respect to inventions made in the performance of NASA funding agreements with small business firms, colleges, universities, and nonprofit organizations (hereinafter referred to as "small entities") is based on the Bayh-Dole Act (35 U.S.C. 200 et. seq.). The Bayh-Dole Act allows small entities that are a party to a funding agreement with a Federal agency to elect to retain title to inventions made under the funding agreement. Based on the Bayh-Dole Act, the Patent Rights clause in funding agreements with small entities (FAR clause 52.227-11 as modified by NASA FAR Supplement clause 1852.227-11) requires the small entity contractor, subcontractor, grantee or recipient (hereinafter referred to as contractor), to:

- a. Disclose each "Subject Invention" to the Federal agency (through the NASA New Technology Representative identified in the funding agreement) within 2 months after the inventor discloses it in writing to the contractor's personnel responsible for patent matters (a "Subject Invention" is defined in the Patent Rights clause to mean any invention or discovery of the contractor, which is or may be patentable, conceived or first actually reduced to practice in the performance of work under the contract) . Additionally, the NASA FAR Supplement specifies that subject inventions include, but are not limited to, new processes, machines, manufactures, and compositions of matter, and improvements to, or new applications of, existing processes, machines, manufactures, and compositions of matter. Subject inventions also include new computer programs, and improvements to, or new applications of, existing computer programs, whether or not copyrightable or otherwise protectable under Title 17 of the United States Code.);
- b. Elect in writing whether or not to retain title to any such invention by notifying the Federal agency within 2 years of its disclosure to the Federal agency. However, if the invention has been publicized through publication, sale, or public use, the period for election of title may be shortened by the Federal agency (consult your Center's Patent Counsel if you believe this situation, which may create a statutory bar to patenting, applies);
- c. File its initial patent application on a subject invention to which it elects to retain title within one year after election of title, or, if earlier, prior to the end of any statutory bar period; and
- d. Include the Patent Rights clause in any subcontract with a small entity or the New Technology clause (NASA FAR Supplement clause 1852.227-70) in any subcontract with a large entity.

The government has the right to receive title to subject inventions made by small entity contractors, upon written request:

- a. If the contractor has not disclosed the invention within the time specified in the clause;
- b. In any country where the contractor does not elect to retain rights or fails to elect to retain rights to the invention within the time specified in the clause;
- c. In any country where the contractor has not filed a patent application within the time specified in the clause;
- d. In any country where the contractor decides not to continue prosecution of a patent application or pay maintenance fees on an issued patent; and
- e. In any country where the contractor no longer desires to retain title.

Once NASA obtains titles to inventions, NASA may file patent applications and license the applications and any resulting patents obtained.

NASA's policy with respect to inventions made in the performance of NASA funding agreements with other than a small entity (i.e., large businesses, hereinafter referred to as "large entities") and the allocation of related property rights is based on Section 305 of the National Aeronautics and Space Act (42 U.S.C. 2457). In accordance with the Space Act, the Federal Government owns inventions made under NASA funding agreements with large entities. However, the Administrator may grant the contractor a waiver of title in accordance with the NASA Patent Waiver Regulations. For NASA funding agreements with large entities, it is the policy of NASA to waive the rights of the United States to acquire title in and to any subject invention (with the reservation of a government license) if the Administrator determines that the interests of the United States will be served.

Based on the Space Act, the New Technology and Request for Waiver of Rights to Inventions clauses (NASA FAR Supplement clauses 1852.227-70 and 1852.227-71, respectively) are included in all NASA funding agreements with large entities if the funding agreement has as a purpose the performance of experimental, developmental, research, design, or engineering work. Under these clauses, for the contractor to obtain title to an invention, it must:

- a. Disclose each "Reportable Item" to NASA (through the NASA New Technology Representative identified in the funding agreement) within two months after the inventor discloses it in writing to the contractor's personnel responsible for administration of the New Technology clause or, earlier, within six months after the contractor becomes aware that a reportable item has been made (A "Reportable Item" is defined in the New Technology clause to mean any invention, discovery, improvement, or innovation of the contractor, whether or not patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of any work under any NASA contract. Reportable items include, but are not limited to, new processes, machines, manufactures, and Compositions of matter, and improvements to, or new applications of, existing processes, machines, manufactures, and compositions of matter. Reportable items also include new computer programs, and improvements to, or new applications of, existing computer programs, whether or not copyrightable or otherwise protectable under Title 17 of the United States Code.);
- b. Petition for a waiver of title to an identified invention within eight months of first disclosure of the invention to the Federal agency;
- c. After NASA grants the waiver; and
- d. Include the Patent Rights clause in any subcontract with a small entity or the New Technology clause in any subcontract with a large entity.

If the contractor fails to disclose, request waiver, or file a patent application in accordance with the funding agreement (or if a waiver is denied), the government retains title to the invention. In such cases, NASA may file patent applications and license the applications and any resulting patents obtained.

NASA's goal is to provide the widest practicable and appropriate dissemination, early utilization, expeditious development, and continued availability of NASA funded and developed technology for the benefit of the United States scientific, industrial, and commercial communities and the general public. Many commercially valuable technological advances have resulted from innovations developed under NASA funding agreements. In order for NASA to achieve this goal, NASA must be able to identify and monitor such technologies, and assert intellectual property rights if appropriate. Therefore, the Technology Reporting requirements in NASA funding agreements require that contractors provide NASA:

- a. "New Technology Reports" disclosing each reportable item or subject invention developed under the contract within two months after the inventor discloses it in writing to the Contractor;
- b. "Interim Reports" every 12 months from the date of the contract listing all reportable items or subject inventions required to be disclosed during the reporting period, or certifying that there were none; and
- c. A "Final Report" prior to contract closeout listing all reportable items or subject inventions developed during performance of the contract, or certifying that there were none.

New Technology Reports are the primary means for identifying inventions and innovations developed under NASA contracts. The Agency is prevented from achieving full success in its commercial technology mission when innovations are not identified or reports are not submitted in a timely manner. Moreover, the Agency (and each Center) may be losing the benefit of royalty income received from the licensing of patents on inventions which NASA has funded, but has lost, through the contractor's failure to report.

It is important that the government and the contractor know, protect, and exercise their rights in inventions, discoveries, improvements, and innovations made in the performance of work under NASA funding agreements in order to ensure their expeditious availability to the public; foster commercial use; enable the government, its contractors, and the public to avoid unnecessary payment of royalties; and defend themselves against claims and suits for infringement. To attain these ends, contracts having the New Technology clause or the Patent Rights clause should be administered so that:

- a. Reportable items and subject inventions are identified, disclosed, and reported;
- b. Requests for waiver of title or election of title, when appropriate, are timely made;
- c. The rights of the Government in reportable items and subject inventions are established;
- d. Where patent protection is appropriate, patent applications are timely filed;
- e. The rights of the Government in patent applications are documented by formal instruments such as licenses or assignments; and
- f. Expeditious commercial utilization of inventions is achieved.

New Technology Representative and Patent Representative will be identified in each contract containing the New Technology clause (in contracts with large entities) or the Patent Rights clause (in contracts with small entities). These NASA personnel administer the clause, protect the government's rights, and take other actions in relation thereto. Normally, the New Technology Representative will be the Technology Transfer Officer or the staff member (by titled position) having cognizance of technology utilization matters for the Center concerned; and the Patent Representative will be the Patent Counsel (by titled position) having cognizance of patent matters for the Center concerned. Disclosure by the contractor of inventions, interim reports, final reports, utilization reports, and other reports required by the New Technology or Patent Rights clause, as well as any correspondence with respect to such matters, should be directed to the New Technology Representative unless transmitted in response to correspondence or request from the Patent Representative. Inquiries or requests regarding disposition of rights, election of rights, or related matters should be directed to the Patent Representative.

In order to protect the government's rights in technology developed under funding agreements, the following NASA officials should take the listed actions (refer to the New Technology Reporting Process flowchart).

The New Technology Representative should take the following actions:

- a. Monitor technical progress reports to ascertain whether the contractor is complying with the new technology clause's reporting requirements;
- b. Receive and review New Technology, Interim and Final Reports from the contractor and determine, in consultation with the Contracting Officer's Technical Representative (COTR) or Program Manager (if necessary), whether submitted reports are acceptable;
- c. Request that the contractor submit Interim and/or Final Reports if not timely submitted;
- d. Forward to the Patent Representative copies of all New Technology Reports submitted by the contractor;
- e. Forward to the Patent Representative all correspondence relating to inventions and waivers under the New Technology clause or election of title under the Patent Rights clause;
- f. Enter New Technology Reporting information into NASA TechTracS;
- g. If necessary, consult the COTR or Program Manager, prior to requesting that the contractor reconsider and re-submit Interim Reports deemed to be incomplete;
- h. After consulting the COTR or Program Manager (where necessary), request that the contractor submit any New Technology Reports listed on Interim and/or Final Reports that have not been previously submitted;
- i. Upon receipt of any final report required by the clause, and upon determination that all work is complete, determine whether the contractor has complied with the clause's reporting requirements. If so, the New Technology Representative shall certify compliance, obtain the Patent Representative's concurrence, and forward the certification to the contracting/grants officer.

The Contracting Officer's Technical Representative (COTR) or activity personnel should take the following actions:

- a. Monitor the technical progress of work performed under the contract to ascertain whether the contractor is

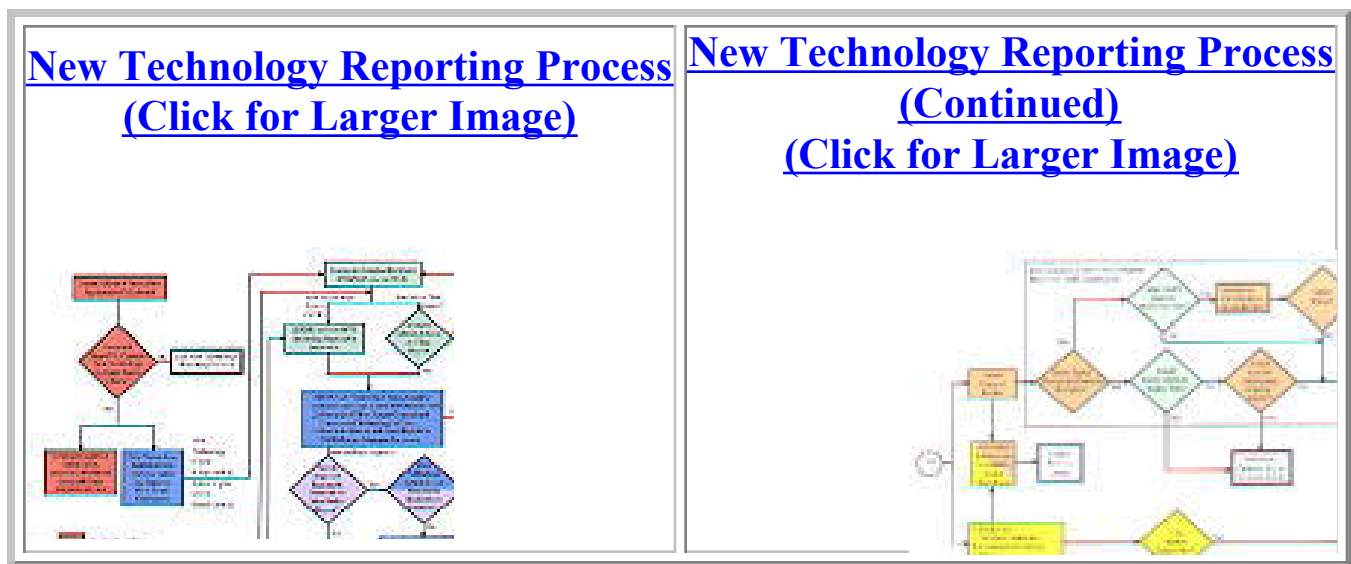
complying with the clause's reporting requirements; and

b. Review all Interim and Final Reports to determine whether all expected reportable items or subject inventions have been disclosed and provide input to the New Technology Representative.

The Patent Representative should take the following actions:

- a. Review each reportable item to ascertain whether it is to be considered a subject invention, and obtain any determinations required by the Patent Rights clause and the New Technology clause;
- b. Review New Technology Reports to ensure that the contractor has provided sufficient information to protect the Government's rights and interests in it and to permit the preparation, filing, and prosecution of patent applications;
- c. Enter patent related information into NASATechTracS;
- d. Determine inventorship, patentable subject matter, authorship of copyrightable software, and rights to intellectual property;
- e. Ensure the preparation of instruments establishing the government's rights; and
- f. Determine when information disclosed in New Technology Reports may be publicly released and approve or deny requests for such public releases.

The Contracting Officer shall not approve release of final payment under the contract and, if applicable, any reserve set aside under the withholding provisions of the clause for deficiencies and delinquent reporting not corrected as of the time of the submission of the final report by the contractor until receipt of the New Technology Representative's certification of compliance, and the Patent Representative's concurrence.



#### New Technology Reporting Process Definitions

<b>Contract/Grant/CA-</b>	Contracts, Grants and Cooperative Agreements.
<b>Small Entity-</b>	Small business firms, colleges, universities, and non-profit organizations are all considered small entities. Contracts, grants and cooperative agreements with small businesses will include the Patent Rights clause required under the Bayh-Dole Act.

<b>Large Entity-</b>	Everything other than small business firms, colleges, or non profit organizations is considered a large entity. Contracts, grants, and cooperative agreements with large entities include the New Technology clause required under the National Aeronautics and Space Act of 1958.
<b>Reportable Innovation-</b>	Reportable Innovations include: (1) Subject Inventions under Patent Rights clause for small entities; and (2) Reportable Items under the New Technology clause for large entities and (3) software.
<b>NTR-</b>	A New Technology Report (NTR) is a detailed disclosure of individual Reportable Items. Contractors, grantees and recipients are to disclose Reportable Items preferably on NASA Form 1679.
<b>Interim/Final Reports-</b>	An Interim Report shall be provided every 12 months, listing Reportable Innovations during that period, or certifying that there were none. A Final Report shall be provided prior to contract closeout listing all Innovations, or certifying that there were none.

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## Appendix C. Technology Commercialization Metrics and Trend Indicators

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### Overview

Metrics and trend indicators are a major tool for managing the effectiveness of NASA's technology commercialization process. At this time, technology commercialization metrics and trend indicators will focus on "output" from the technology commercialization process; e.g. how many new technologies were identified; how many partnerships were implemented; and how many partnerships resulted in success stories. Studies are underway to determine if and what metrics/indicators could be used to evaluate the "outcomes" from the technology commercialization process; e.g., what economic impacts are resulting from our "outputs." This NPR does not anticipate establishing metrics and indicators which focus on "process efficiencies," e.g. how long does it take to process a "partnership lead." However, each CTO has the option of defining and using additional metrics and indicators at their respective Centers.

Given the Government Performance and Results Act (GPRA), it is essential to correlate and directly trace technology commercialization performance to NASA's resource investments. This is particularly true given that over 80% of NASA's resources are invested in contracts, grants and agreements. This correlation and traceability is established and maintained via monthly data updates from NASA's financial and procurement data system. Each month, summary financial and procurement data is obtained and integrated into each Centers' NASATechTracS system.

All metrics and indicators are collected, calculated and maintained in NASATechTracS. A standard metrics module is contained in each Center's NASATechTracS system. Each month the metrics module automatically:

- (1) Calculates the metrics and indicators for that Center's activities;
- (2) Creates reports that can be utilized by designated Center and Enterprise managers; and
- (3) Updates the Agencywide NASATechTracS server.

Technology commercialization metrics and trend indicators will also be available via the Knowledge Integration and Management System (KIMS). KIMS is a major component of the NASATechTracS network and a primary interface for NASA managers (see paragraph 2.3.2).

As addressed in Chapter 7, there are five performance categories. Each of these relates to one of the major technology commercialization process elements shown in Figure 2-1 of Chapter 2.

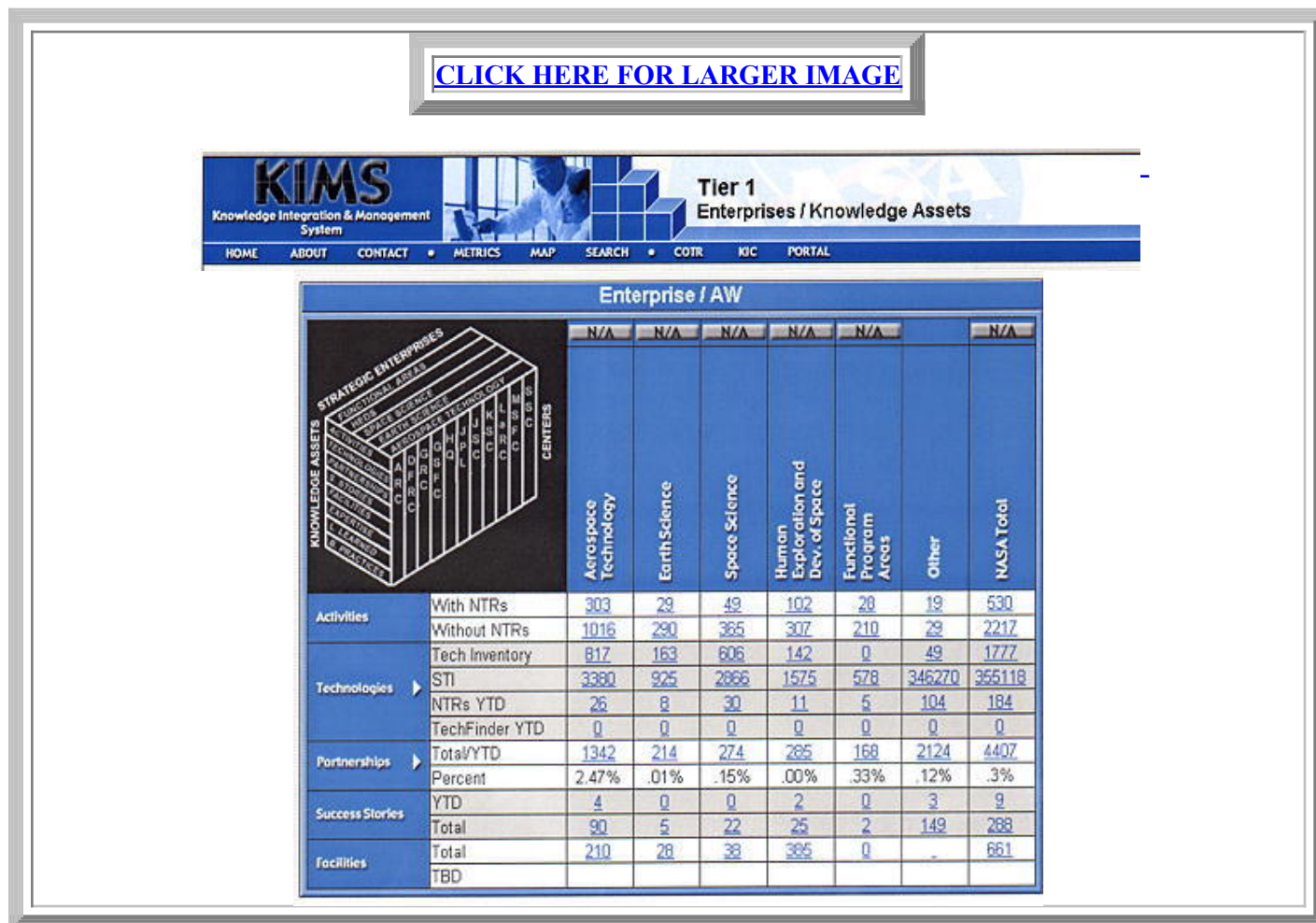
### Commercialization Assessments

This category is directed towards the initial process element in Chapter 3 - identifying those NASA activities which have commercial potential. Activities are defined as those contracts, grants or agreements for which budgetary obligations or costing activity is occurring. This is determined with an automated procedure in NASATechTracS, which utilizes the monthly data inputs from NASA's financial and procurement system. NASA invests approximately \$12 billion annually in these activities. The metrics process will refer to these as NASA's extra-mural activities. Centers can also include other activities, which are not supported with contracts, grants or agreements such as Memorandum of Agreements (MOAs) and Memorandum of Understanding (MOUs). NASA also invests approximately \$2 billion in support of its in-house workforce and activities. The metrics process will refer to these as NASA's intra-mural activities. The commercial assessment process does not address NASA's intra-mural activities due to the difficulty in tracing NASA's intra-mural resources to programs and projects. Once NASA has implemented its full cost accounting process, the commercial assessment process will be revised to incorporate the intra-mural activities and a revision to this NPR will be issued.

Each NASA activity manager is responsible for assessing their activities as having, or not having, commercial

potential. As discussed in Chapter 3, having some likelihood of yielding an innovative technological asset is the minimum criteria for demonstrating commercial potential. As directed by NPD 7500.2, technological assets include new technologies, innovations, facilities and expertise. At this time, however, this NPR is focusing on new technologies and innovations. As discussed in Chapters 3 & 4 new technologies and innovations include both "reportable items" and "subject inventions" developed under NASA contracts, grants and cooperative agreements. Work is underway to further define how facilities and expertise shall be incorporated into the technology commercialization process. Future updates to this NPR will be issued to address these areas.

NASA activity managers can provide their assessment using the KIMS module of the NASATechTracS system. By registering at KIMS (<http://kims.larc.nasa.gov>) the manager can log in and assess the status of their activities. Once logged in, the manager can select the "COTR" item on the menu bar as shown below.



Until assessed, each activity is shown as having unassessed/unknown commercial potential by default. If the manager assesses the activity as having "no potential", then no additional information is required. If the activity is assessed as having commercial potential - then some additional data is required at the 7-digit UPN level. The 7-digit data is required in order to correlate "assessments" with the appropriate Strategic Enterprise. Once an initial assessment is baselined, the NASA activity manager should update it whenever new factors warrant it - but at least annually.

As new technologies and innovations are reported, NASATechTracS automatically correlates these with their source activity and financial data. Again, this allows the technologies to be correlated with NASA's Strategic Enterprises.

The specific trend indicators currently calculated for this category are:

(1) Activities with Potential (trend indicator) - this indicator is a percentage which compares the fiscal year \$\$s obligated to that activity with its total obligations for the year. At an agency-wide level, it provides a general understanding of what portion of NASA activities contain commercial potential. This measurement is calculated at the 7-digit UPN level for every NASA contract, grant and agreement. Purchase orders under \$50K are not included.

(2) Activities with No Potential (trend indicator) - this is the inverse of the above indicator.

(3) Unassessed/Unknown(trend indicator) - this indicator shows that either the activity has not been assessed or has been assessed and the manager is unsure as to whether the activity has potential.

(4) Activities with New Technologies (trend indicator) - this is the percentage of those activities defined in (1) above which have actually reported at least one new technology or innovation.

(5) Activities without New Technologies (trend indicator) - this is the inverse of item (4) above.

Again, each manager can use KIMs to both provide the assessment data and to see the status of their activities. Each CTO can assist managers in getting access to, and using, KIMS.

## New Technologies and Innovations

This category is directed towards determining how well the "develop and report technologies" process element (in Chapter 3) is being performed. Specifically, it tracks the output status of those activities assessed as having commercial potential and which have actually produced/reported new technologies as discussed above. As new technologies are reported, NASATechTracS will automatically notify the NASA activity manager or designated recipient via email. The email will contain an electronic link (URL) which will take the manager to the new technology listing where the manager can review and concur that the new technology is associated with their activity. From that point forward NASATechTracS will automatically track and compute the applicable indicators and metrics described below. If the manager has any questions they can contact that Center's New Technology Representative.

Tracking the status of these new technologies is extremely important in that they are an essential ingredient for effective commercial technology partnerships. Because of this importance, NASA is currently using 5 measurements to determine the performance status of this category. Four of these are trend indicators and one is a GPRA metric as follows:

(1) Activities With New Technologies (trend indicator) - this indicator measures the percentage of those activities which have commercial potential which have actually reported a new technology or innovation. Again as used here, activities are those contracts, grants and agreements which are incurring budgetary obligations and/or costing and which have been assessed as having commercial potential.

(2) Year-to-Date Technology Portfolio (trend indicator) - this indicator shows the number of new technologies that have been reported to-date for the fiscal year. Currently, it is broken down into two categories.

- Extra-mural items are those from contracts, grants and agreements. These items are reported by both Center and Strategic Enterprises.

- Intra-mural items are those directly from NASA's in-house activities, reported by "Center."

(3) Total Current Technology Portfolio (trend indicator) - this indicator shows the total number of new technologies and innovations that NASA considers most current. The reasoning behind this "currency concept," is that NASA most likely has ready access to the technical points of contact for those new technologies and innovations. Again, this indicator is broken down into extra-mural and intra-mural items. For extra-mural items, it is all those new technologies from the preceding five years and any others which are related to ongoing extra-mural activities. For intra-mural items, it is all those within the preceding five years

(4) Technologies Released to the Public (metric) - this indicator represents the total number of new technologies and innovations that have been released for public access for the fiscal year- to-date. Specifically, it consists of those items made available to the public via the NASA TechFinder web site. Public availability is important to both our marketing and outreach activities. In addition, it is also one of the items reported annually to GPRA in support of NASA's Communicate Knowledge (CK) process. The specific goal is to release 100 items each year. Because we have a specific target, it has been designated a "metric." Currently this metric is under review. Any changes will be incorporated in future releases of this NPR.

(5) Portfolio Available to the Public (trend indicator) - this indicator shows the percentage of the total current technology portfolio (item (3) above) that is available to the public via TechFinder.

## Partnerships

This category focuses on the development and implementation of the partnership process elements (Chapter 5). Specifically, it identifies and tracks those NASA's activities which qualify as commercial technology partnerships (see

Chapter 5 for partnership criteria definition); develops estimates of the NASA resources invested in the partnership; and compares that investment to the resources NASA invests in its R&D activities (heretofore referred to as R&D base). Currently there are two measurements in this category as follows:

(1) Active Partnership Portfolio (trend indicator) - this measurement identifies those NASA activities which qualify as commercial technology partnerships. It is a count of those partnerships which have been active for any portion of that fiscal year.

(2) Partnership Investment (metric) - this measurement compares the resources which NASA invests in its partnerships (numerator) to its R&D base (denominator - defined below). NASA reports this metric annually as part of its GPRA response, derived from the 1993 National Performance Review recommendations. NASA's GPRA goal for investment in commercial technology partnerships is approximately 10-20% of its R&D investment. As described above, this percentage is calculated by comparing NASA resources invested in partnerships to NASA resources invested in its R&D base. Note that "resources invested in partnerships" include:

(a) Direct Funds to the partnership - funds that are obligated to the partnership through the traditional budgeting and procurement process.

(b) In-House resources - NASA engineer or researcher's time; and

(c) In-Kind resources - resources such as NASA facilities.

R&D Base Definition - the R&D base includes all of NASA's investment in acquisition activities that have been categorized as R&D by the Federal Product and Services Classification (FPSC) coding structure. This tool is used government-wide by all federal procurement offices. As full cost accounting is implemented at NASA, NASA's in-house R&D investment will be added to the overall R&D base. NASATechTracS automatically calculates the R&D base from the monthly data input from NASA's financial system.

## Success Stories

This category focuses on the identifying and reporting success story process element Chapter 6. It's focus is to determine which partnerships are actually yielding success stories. Currently this category has two measurements:

(1) Year to Date Portfolio (trend indicator) - this measurement identifies those success stories which have been identified and released to the public during the current fiscal year.

(2) Total Current Portfolio (trend indicator) - this measurement is the total cumulative set of success stories.

## Economic Impacts

This performance category is currently under study. If developed, measurements in this category would provide insight into the type of economic impacts that the NASA technology commercialization activities are having on the economy.

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## Appendix D. Sample Commercialization Deliverables for Contracts/Grants/Agreements

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### DATA REQUIREMENT DESCRIPTION

*(Sample Technology Commercialization Plan Requirement)*

1. Title: Technology Commercialization Plan
2. Use: To describe the Contractor's plan for implementation of NASA's technology commercialization policies
3. Date:
4. Organization:
5. Frequency: The initial report submittal shall be 30 days after the contract start and updated on a yearly basis or as needed.
6. Distribution: Original to Contracting Officer; Copies to COTR and Commercial Technology Office.
7. Preparation Information: The Contractor shall establish a written, detailed Technology Commercialization Plan setting forth the manner in which the contractor will meet the new technology reporting requirements of the Patent Rights clause (FAR 52.227-11 as modified by NFS 1852.227-11) or New Technology clause (NFS 1852.227-70), as applicable. The plan will also identify how the contractor will implement NASA's technology commercialization policy set forth in [NPD 7500.2](#), NASA Commercial Technology Policy. The plan shall address, at a minimum, the following:
  - (1) Identification of specific areas of technical effort that are considered likely to generate new technology.
  - (2) Description of the means by which project supervisory and technical personnel will be advised of the responsibilities, details, and benefits of new technology reporting.
  - (3) Description of the procedures to be established, maintained, and followed for reviewing the effort to be undertaken for the purposes of identification and reporting (disclosure) of subject inventions or reportable items within the time periods and in the manner prescribed by the Patent Rights or New Technology clause.
  - (4) Description of the procedure for timely submission of the interim and final reports required by the Patent Rights or New Technology clause.
  - (5) Description of the procedures for providing prompt notification of either the award of subcontracts having as a purpose the conduct of experimental, developmental, research, design, or engineering work or of a prospective subcontractor's refusal to accept the flow down of the Patent Rights or New Technology clauses into the subcontract as required by the Patent Rights or New Technology and Data Rights clauses in the prime contract.
  - (6) Identification of the individual(s) assigned substantial and specific responsibilities for ensuring compliance with the requirements of the Patent Rights or New Technology clause, as well as their qualifications and organizational placement to discharge these responsibilities.
  - (7) Establishment of a technology commercialization point of contact for coordinating all technology commercialization activities.
  - (8) The Contractor's commitment to the development of cutting-edge dual use technologies having both application within and outside of the aerospace community.
  - (9) Programs aimed at educating and motivating employees to report new technology.

(10) Programs that assist subcontractors in establishing technology transfer policies and implementing technology commercialization plans.

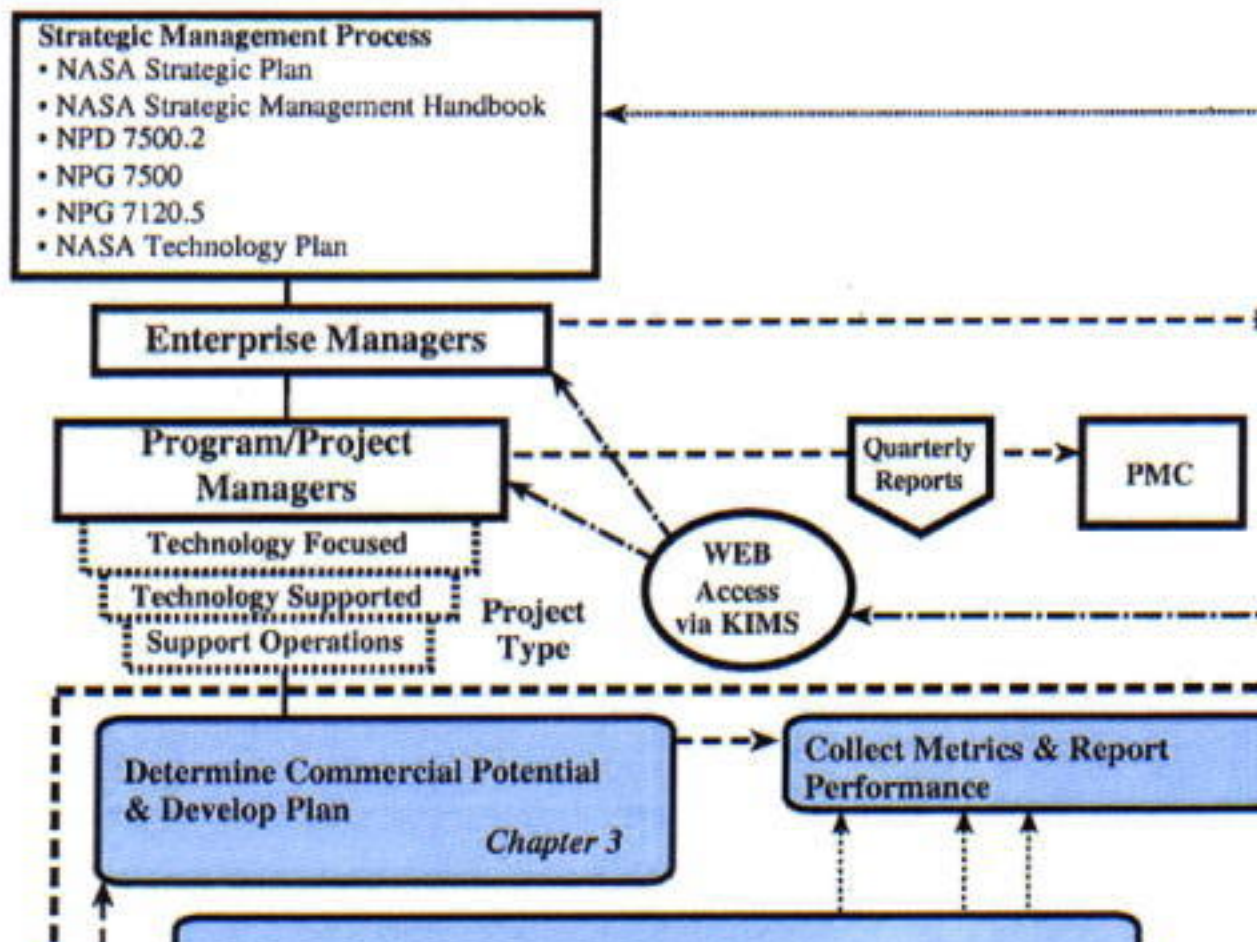
(11) Programs that support NASA's outreach and industry assistance efforts pertaining to technology commercialization.

(12) Programs aimed at conducting collaborative efforts or establishing commercial partnerships with third parties for the purpose of effectively commercializing technology. (Funding for such collaborative efforts will not necessarily include government funds and may consist totally of private funds. These collaborative efforts shall be reviewed and, where government funds are to be used, approved in writing by the Contracting Officer. Ownership of rights to the technology developed under these collaborative efforts shall be addressed in the individual agreements that are negotiated as part of the technology commercialization process.)

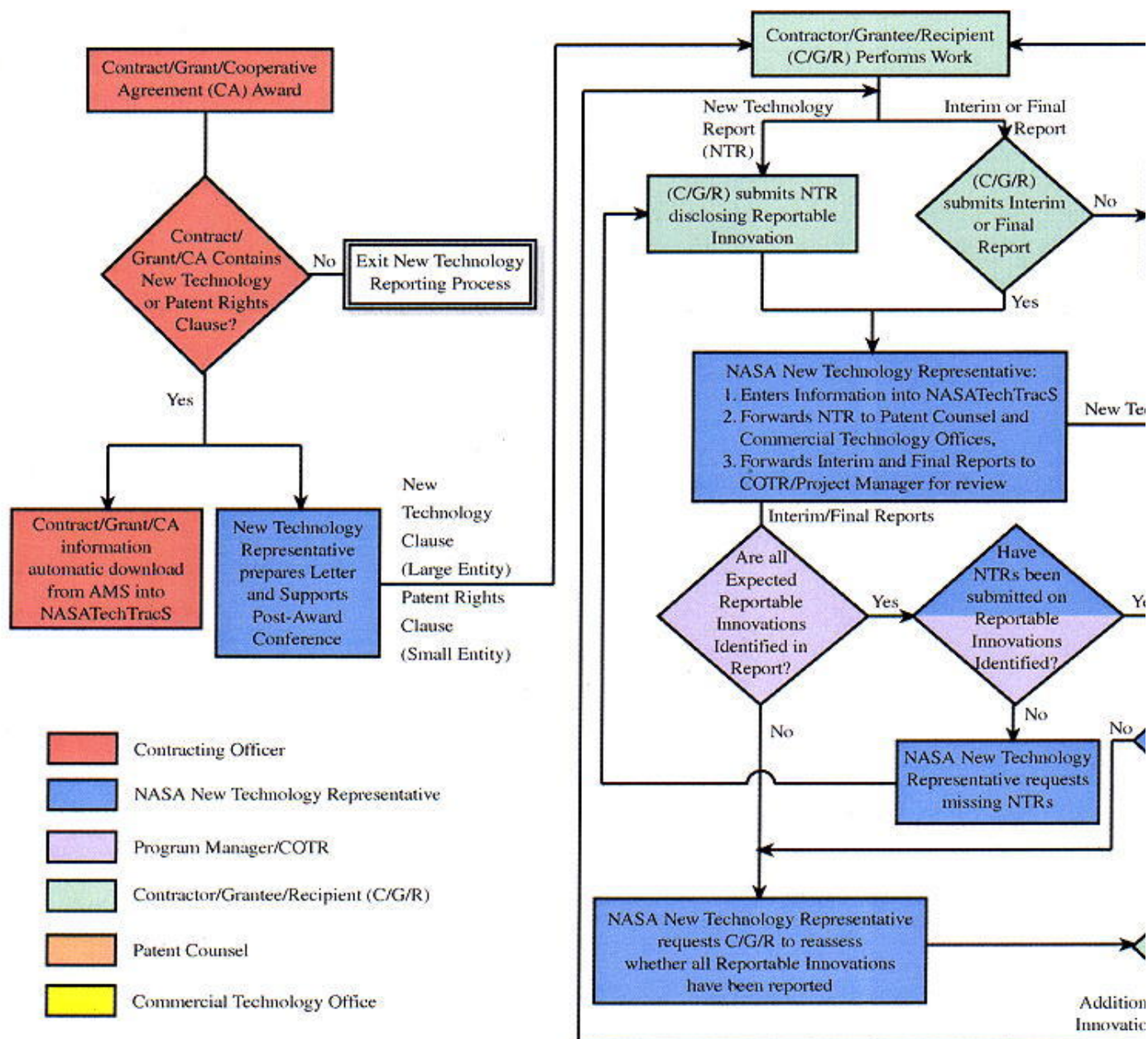
(13) Programs aimed at conducting application engineering work for the purpose of adapting the developed technology to a specific commercial use.

(14) Programs that demonstrate strong management commitment to technology commercialization.

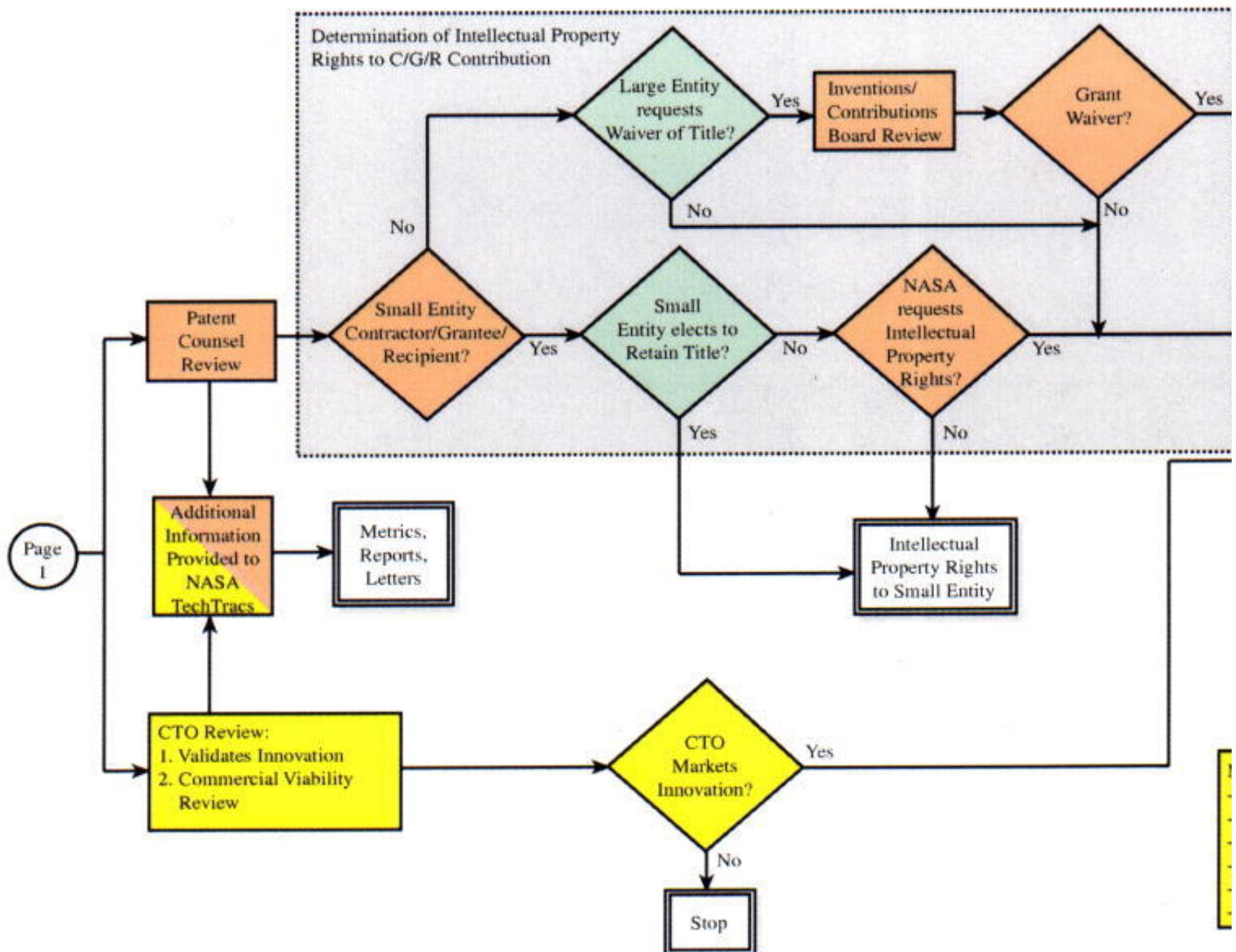
8. Intellectual Property Rights: To maximize the benefits received from the program, it will be necessary to identify and protect the intellectual property rights associated with the technology developed under this contract (i.e., patents and copyrights).



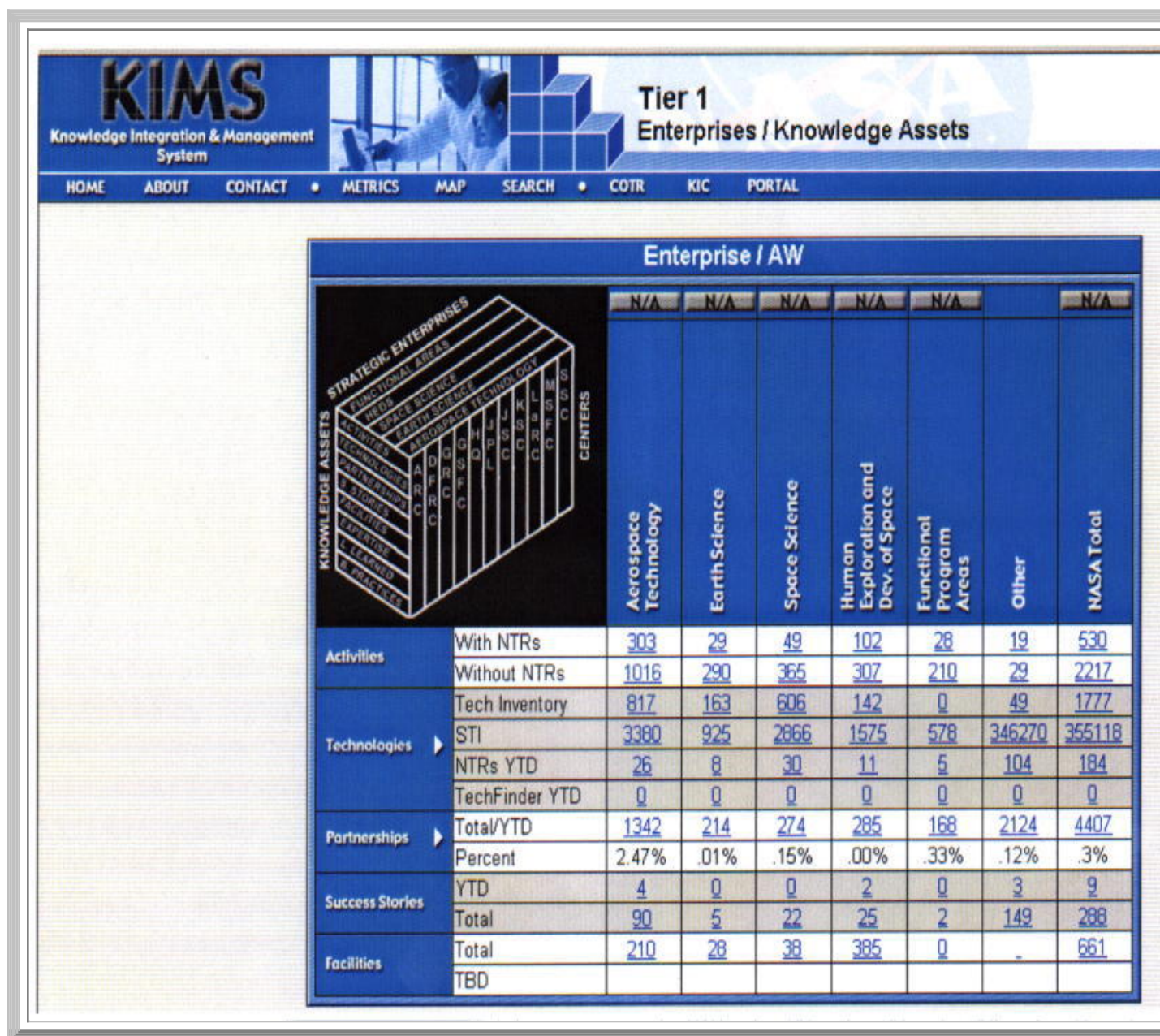
[Return to Chapter 2 \(Figure 2-1\)](#)



[Return to Appendix B \(Process Diagram\)](#)



[Return to Appendix B \(Process Diagram\)](#)



[Return to Appendix C \(COTR Chart\)](#)

